

EDITED BY

T. MAX

FRIESEN

OWEN K.

MASON



≡ The Oxford Handbook of
**THE PREHISTORIC
ARCTIC**

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THE OXFORD HANDBOOK OF

THE
PREHISTORIC
ARCTIC

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and

OWEN K. MASON

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INTRODUCTION

Archaeology of the North American Arctic

T. MAX FRIESEN AND OWEN K. MASON

INTRODUCTION

THE vast expanse of the North American Arctic, stretching 6,000 km west to east and 3,000 km south to north, is home to an array of dynamic modern peoples, whose rich cultural history extends over many millennia. Through the centuries, these societies interacted with one another, dealt with often unpredictable and changing environments, developed complex ideologies, and innovated new technologies. Due to the generally cold and often dry conditions, and low levels of surface vegetation and soil development, their activities and experiences are preserved to a degree rarely matched elsewhere in the world. This book is a detailed entry point to their history, emphasizing the last 5,000 years.

The Arctic is a unique place for human occupation, and for the examination of human histories. It encompasses a diversity of climates, landscapes, and ecosystems, ranging from nearly vegetation-free beach ridges of the High Arctic to the marsh tundra Aleutian Islands and forested Subarctic biota of Newfoundland. Extremes of climate and geography produce very long cold winters and short cool summers, and the highest latitudes experience days, weeks, or even months without true day or night. Variability in sea-ice formation and movement, and in the amount and type of snow cover, impose crucial mobility constraints on present and past peoples. While plant foods are scarce and limited in variety, animals of sea, land, and river are often locally abundant, but enforce a series of tight limiting conditions on people's lives. Furthermore, animals, landscapes, and people were intertwined in ideological and social networks that occasioned complex world views, which in turn affected the choices of individuals and groups. Together, these challenges and constraints led to the Arctic being one of the last places on earth to be inhabited by people.

Many of the challenges faced by ancient societies in the region also erect barriers to modern archaeologists. The region, however, has had an allure for outsiders, who often perceive it to be located at the end of the known world. Professional archaeology, often colonial in nature, had an early start in the 1910s to 1930s, with archaeological pioneers attracted to locales adjacent to established communities, often adopting the life styles of local people while conducting research. Even at present, with improved air transport, the high costs, logistical challenges, and difficult environmental conditions mean that only a few major research projects occur across this vast region each summer. In physical terms, immense areas remain unknown, and as will be seen throughout this book, understanding of some major periods and processes in regional prehistory remains elusive. Furthermore, the financial and logistical uncertainties in launching new projects lead researchers to rely on “legacy” data often collected nearly a century ago, with widely differing tactical and research paradigms.

Given all of the barriers and handicaps, why do archaeologists choose to work in the Arctic? The answer to this question can be complex and even biographical, but boils down to the considerable contribution that Arctic archaeology can offer in several domains. Most obviously, archaeology contributes directly to the modern North, by unraveling pieces of the historic puzzle, which when combined with Elders’ historical knowledge, and with the existing ethnographic and ethnohistoric records, leads to more comprehensive culture histories. This is particularly true for cases in which people have experienced drastic population reductions and/or displacements, with negative impacts on the retention of historical knowledge. The resultant story from archaeology is one of a resilient, diverse, and, in general, highly successful array of societies. Archaeology is also increasingly viewed as a means to link modern communities with land, history, and tradition; under ideal conditions bringing together elder and younger generations in this era of dizzying culture change.

Arctic archaeology also offers considerable potential for the academic world beyond the North. Because of the region’s exceptional preservation of many data classes, venerable ethnographic record, and relatively simple ecosystems, many aspects of past human lifeways can be easier to reconstruct, and understand, than they are in most other contexts. Thus, Arctic archaeologists can contribute exceedingly high-resolution case studies, and frame fresh insights, relating to issues as diverse as hunter-gatherer settlement patterns, the character and history of shamanism, the development of inter-household status differences, the long-term interaction of people with the ecosystem, and responses to climate change. Resulting from this set of possibilities, Arctic peoples from the ethnographic and archaeological records become a valued source of analogs for archaeologists studying prehistoric hunter-gatherers in other times and places, especially in areas without modern hunter-gatherers.

Coverage of this Volume

The North American Arctic has produced a steady stream of important and thought-provoking archaeological research over the past few decades. However, it is underserved

in terms of regionwide syntheses. Many available studies are of very high quality, but do not provide the depth of coverage in these chapters because they were written for the general public (e.g., McGhee 2004; Schledermann 1996), or were written decades ago and therefore do not reflect recent advances in scholarship (e.g., Dumond 1987; Maxwell 1985). Thus, this book is intended to fill a major gap in the literature.

In this volume, the “Arctic” is predominantly defined by culture, rather than geography. Geographers usually define the Arctic as the regions north of the tree line, generally coextensive with the 10° C July isotherm, as the region with soils underlain by permafrost, or most conservatively, as the zone above the Arctic Circle (66° 33′ N; the line north of which the sun does not set for at least one “night” per year). While a great majority of the coverage in the volume falls within these zones, it also includes some “Subarctic” regions, particularly at the southwestern and southeastern margins of the North. This is because these regions were occupied primarily or occasionally by peoples who were culturally “Arctic”; that is, peoples for whom a majority of settlement occurred in the Arctic, but who sometimes expanded their territory to include more southerly latitudes. It includes those regions settled by modern descendants of the primary Arctic traditions, particularly Inuit, Iñupiat, Inuvialuit, Yupik, and Aleut peoples and their ancestors. Thus, we include areas in southern Alaska, including the Kodiak archipelago in the North Pacific, the Aleutians, and the Alaska Peninsula—technically Subarctic, but critically important to the history of several Arctic peoples. At the other extreme, the Subarctic coasts of Labrador and Newfoundland are included, since Pre-Dorset, Dorset, and Inuit all occupied parts of this region at different times.

This volume aims to be a comprehensive account of the archaeology of indigenous peoples in the North American Arctic. As such, there are a number of areas that are not covered in detail. In particular, the successive waves of European expansion that reached the region from east, south, and west are covered only to the degree necessary to understand indigenous peoples’ lives. Likewise, the volume includes relatively little coverage of early Paleoindian and Archaic archaeology, since these topics are better covered elsewhere. Furthermore, this volume does not include extensive coverage of interior Subarctic peoples, though there are two chapters on interior regions of the western and central Subarctic to provide context for the remainder of the volume.

CENTRAL THEMES IN ARCTIC ARCHAEOLOGY

Archaeologists working in the Arctic attempt to reconstruct human lifeways at particular times and places in the past, or to explain why aspects of those lifeways changed over time. To address these issues, however, archaeologists must deal with several themes and issues that in combination are unique to the region and have a major impact on interpretation. Following are brief overviews of four of the themes encountered frequently in the literature, but which are not treated in separate chapters in this book. Thus, we do not include discussion of important themes such as community-based archaeology

or zooarchaeology, since they are covered in depth in chapters by Lyons (chapter 8) and Betts (chapter 3), respectively. Furthermore, some other themes, such as social organization or ideology, are well described within many of the detailed chapters that follow, and thus are not covered in this introductory chapter. As such, the four themes defined below are not intended to be an exhaustive list of issues covered by Arctic archaeologists; rather they are a set of issues that are most pervasive, and thus provide perspective for the chapters that follow.

Ethnographic Analogy

Ethnographic analogy, the use of information about modern and recent peoples to understand phenomena in the archaeological record, is a fundamental part of archaeological interpretation in many contexts around the globe. However, the process has special meanings, strengths, and potential problems in the Arctic. The ethnographic record is still growing; modern Inuit (a term used in this chapter as short hand for Inuit, Inupiat, Inuvialuit, and other related peoples) continue to record important historical, cultural, and environmental knowledge which is directly relevant to archaeological research. In addition, comprehensive late nineteenth- and early twentieth-century ethnographies detail myriad aspects of life in Siberia (e.g., Bogoras 1904–1909), Alaska (e.g., Murdoch 1892; Nelson 1899), the Canadian Arctic (e.g., Birket-Smith 1929; Boas 1888; Jenness 1922; Rasmussen 1931; Stefánsson 1919), and Greenland (e.g., Birket-Smith 1924; Thalbitzer 1914–1941). The quality of these ethnographies is remarkably high, primarily because of the relative isolation of large parts of the Arctic. Due to the infrequency of encounters between Inuit and Europeans, ethnographic accounts were penned when the discipline of cultural anthropology had begun to be codified, so that emerging specialist scientists recorded Inuit lifeways while many “traditional” elements were still retained. Furthermore, the scope of ethnographical protocols often included the complete cataloguing of material objects and linguistic categories, as well as folk tales and music. Following this “golden age” of Arctic ethnography, many accomplished anthropologists and ethnohistorians continued to distill important information from written documents and interviews with northerners, leading to continued expansion of our knowledge of Arctic peoples’ histories (e.g., Burch 1998, 2006; Damas 2002; Jensen et al. 2011; Krupnik and Chlenov 2013; Ray 1975; Taylor 1974).

This extensive and high-quality ethnographic information is a prime source of analogs for virtually every aspect of past Arctic lifeways. In its most straightforward guise, this analogical process takes the form of the “direct historical approach” (cf. “upstreaming”), in which a direct connection between the source (ethnographically described people) and subject (prehistoric people) is either demonstrated or inferred (Burch 1988). The direct historical approach allows Arctic archaeologists to confidently assign functions to the vast array of artifacts they excavate at later prehistoric sites. Inuit had one of the most complex and diverse technological repertoires ever recorded for a preindustrial society, with specialized multicomponent implements for almost every conceivable

purpose (Oswalt 1973). Thus, for example, largely with the aid of nineteenth-century ethnographies, archaeologists have identified artifacts such as bird spear parts, war clubs, harpoon line toggles, and needle cases, which could otherwise not have been identified with confidence. Other, more complex aspects of late precontact Inuit lifeways are also regularly approached through comparison with the ethnographic record, including for example gender roles (e.g., papers in Frink et al. 2002).

However, analogical argument is often not straightforward, even for these relatively recent periods. Some aspects of Inuit lives were rarely, if ever, recorded in much detail by anthropologists; chief among these are sexuality and many aspects of ideological practices, particularly those relating to shamanism (Ryan and Young 2013); and since most ethnographers were men, women's experiences and activities were often not recorded in detail. Another potential problem results from the assumption that the ethnographic record represents an unchanging traditional past, when in fact it is a snapshot of Inuit societies undergoing dynamic processes of change linked in part to external influences such as introduced diseases and greatly increasing availability of European trade goods. It therefore provides a relatively narrow view of the range of Inuit societies; and many of those in the past must have been quite different. Thus, for example, it is not completely clear how large the famous "trade fairs" of northern Alaska were before the nineteenth century (Nelson 1899), when they brought increased amounts of metal, tobacco, and other desirable objects into Alaska (Bockstoce 2009). Likewise, Stefánsson's (1919) accounts of the Mackenzie Delta Inuvialuit were written after epidemic diseases had caused the collapse of interregional interaction networks; therefore, other data sources must be employed to understand the organization of precontact territorial groupings.

A related issue with the use of ethnographic analogy is linked to the choice of *which* of the very diverse groups of recent peoples is the most appropriate analog for a particular archaeological case. This is seen most clearly in reconstructions of the Thule culture in the eastern Arctic, dating from A.D. 1200 to 1500. Thule Inuit are widely acknowledged to be the direct ancestors of modern Inuit throughout the eastern Arctic (Friesen, this volume, chapter 28; Raghavan et al. 2014). Based on direct descent, then, one might assume that Inuit of the central Canadian Arctic would provide the best analog for Thule in the same region. However, in fact most archaeologists have concluded that northwest Alaskan Iñupiat, who lived thousands of kilometers away, are the best analog. The latter, like eastern Thule, lived in semisubterranean houses, hunted bowhead whales where available, and relied on stored food for much of the winter; this pattern is very different from that of many recent central Canadian Inuit, who lived in snow houses on the sea ice during the winter, hunting seals at their breathing holes daily. Other aspects of these two groups were also dissimilar, with Alaskan Iñupiat generally living at higher population densities, with a somewhat more hierarchical social organization. By careful use of this nonlocal group as an analog, archaeologists in the eastern Arctic have been able to infer a range of aspects of prehistoric Thule lifeways, ranging from composition of whaling crews and social hierarchies to interaction networks, that would not have been possible if they used the local central Inuit as their only source of analogies (e.g., Friesen 2012; Grier and Savelle 1994; Savelle and Wenzel 2003; Whitridge 1999).

The problems with analogy outlined above are those associated with the direct historical approach; a completely different set of problems occurs when archaeologists try to understand earlier cultures, which lack a strong, direct link to ethnographically described Inuit (e.g., Friesen 2002; Hood 1998). This is seen for example with reconstruction of Norton and Ipiutak lifeways in Alaska; and perhaps most acutely in reconstructions of Paleo-Inuit (Paleoeskimos) in the eastern Arctic (3200 cal B.C. to 1300 cal A.D.). Archaeologists working in the east are acutely aware of the Inuit ethnographic record, and have often used it to make important inferences about Paleo-Inuit, not just because Inuit and Paleo-Inuit lived in the same region, but also because they subsisted on most of the same species, used similar technologies, and in many cases lived at similar population densities. To take just one example: without knowledge of the ethnographic record, it is unlikely that any archaeologist would have imagined that Dorset people could have lived in snow houses on the sea ice; however, this interpretation is now commonplace despite a paucity of direct evidence. At the same time, there is a real danger in overreliance on the Inuit ethnographic record to interpret Paleo-Inuit, whose culture was the end product of thousands of years of separate cultural development. Even though they lived in similar environments, how far are we willing to go in using Inuit analogies to infer elements of complex phenomena such as gender roles (LeMoine 2003), social hierarchies (Mason 1998), shamanic practices (Gulløv and Appelt 2001; Sutherland 2001), or functions of “art” (Hardenberg 2013; Mason 2009)?

Arctic archaeologists grapple with these issues regularly, and the best solution appears to be, on the one hand, to use Inuit ethnographies as a source of testable hypotheses, rather than simply assuming similarities between source and subject, and, on the other, to remain open to broader sources of analogs, for example the wider suite of circumpolar cultures, or hunter-gatherer societies worldwide. Ultimately, Arctic archaeologists are left in the uncomfortable position of striking a balance between overreliance on the Inuit ethnographic record as the source of analogs, which could mask radically different behaviors among non-Inuit peoples, and avoidance of the ethnographic record, which could blunt many of our more powerful potential interpretations.

Chronological Concerns

Since the inception of Arctic archaeology, researchers have wrestled with establishing chronological parameters, and have turned to historical correlations, seriation, dendrochronology, ^{14}C dating, and other techniques. The first attempt at a relative chronology was that of Therkel Mathiassen (1927:7), who compared the uplift of eastern Arctic beach ridges with rates inferred from Scandinavia, to arrive at an approximate age of A.D. 1000 for the entry of Thule peoples into the eastern Arctic. In the western Arctic, a similar historicism led Helge Larsen to postulate that an early maritime culture termed Ipiutak could be linked with the Scythians who thrived on the frontiers of the Greek world ca. 500 B.C. (Larsen and Rainey 1948). As early as the 1920s, Henry Collins (1937) recognized that flights of beach ridges could provide relative age assignments that allowed the

ordering of a Northern Maritime tradition on St. Lawrence Island, from Okvik on the Hillside, to Old Bering Sea on the oldest ridges, Punuk in the middle, and Thule and late prehistoric on the youngest ridges.

Seizing his initiative from the abundant driftwood in many archaeological features, Giddings (1952) established the great promise of dendrochronology for Arctic archaeology. Owing to the paradigmatic shift relating to studies of the Peopling of the Americas in the 1970s that emphasized older, mostly lithic sites, following the untimely death of Giddings in 1964 most Arctic archeologists turned away from tree rings, relying instead on radiocarbon dating. The reapplication of tree rings to Arctic archaeology is a pressing need in current researches across Siberia, Alaska, western Canada, and Labrador, where driftwood remains abundant.

In the Arctic, well-defined stratigraphy is relatively rare. Seventy years after his death, the chronology of the western Arctic still rests upon the shoulders of one man, James Louis Giddings (Mason and Gerlach 1995). Unrivaled as a survey archaeologist, Giddings discovered Onion Portage on the Kobuk River, which contained stratigraphy over three meters deep, incorporating a succession of occupations over the past 10,000 years (Anderson 1988). The eastern Arctic does not contain any sites of comparable duration; however, stratified middens are not unknown. Superimposed cultural layers played a particularly important role at the Crystal II site on Baffin Island, where Henry Collins (1950) found definitive evidence indicating that the Dorset Culture occupation was earlier than, and separate from, the later Thule Inuit component.

Horizontal stratigraphy, as represented by sequences of beach ridges, is central to cultural chronologies across the Arctic (Mason 1993). Because most past campsites were situated on contemporary outer coasts, where beach ridges developed in a regular fashion over time, older sites are farther inland. The effect is literally heightened in the eastern Arctic, where isostatic processes are still lifting many regions; thus older sites are both farther inland and at greater elevations above modern sea level. In Alaska, Giddings, with the aid of geologist David Hopkins, investigated the critically important site of Cape Krusenstern on Kotzebue Sound (Giddings and Anderson 1986). The beach ridge chronology at this locality provided an outline of Alaskan cultural continuities still largely valid today (Anderson and Freeburg 2013; Mason and Ludwig 1990). Beach ridge chronologies also became a mainstay of eastern Arctic cultural sequences. In particular, Jørgen Meldgaard's (1960a, 1960b) work on several long beach ridge sequences in the Igloodik region provided an initial chronology from Pre-Dorset through to modern Inuit occupations. Beach ridge sequences are often of high enough resolution that variability in numbers of dwellings across ridges can be used to infer changing population sizes over time (see Savelle and Dyke 2002 for an eastern example; Anderson and Freeburg 2014 for a western example).

The application of radiocarbon dating to Arctic prehistory was a generational process, from its initial phase in the early 1950s (Rainey and Ralph 1959), through refinement of regionally appropriate approaches (Arundale 1981; McGhee and Tuck 1976), to the critique of facile acceptance of radiocarbon dates (Morrison 2001). The initial results from ^{14}C proved revolutionary, effectively lowering the ages of two "Paleoeskimo" cultures,

Ipiutak and Denbigh. In the case of Ipiutak, Larsen (1954) fought tooth and nail against one “young” date of ca. A.D. 1000, which has since been supported. Likewise, ^{14}C dating allowed the dismissal of suggestions that Denbigh Flint Complex endblades were related to Paleoindian technologies (cf., Giddings 1964). In the eastern Arctic, radiocarbon dating is currently undergoing a renaissance, with re-dating leading to new interpretations of everything from the timing of the earliest Pre-Dorset and Thule Inuit migrations from Alaska (Friesen, this volume, chapter 28) to the nature of the Pre-Dorset to Dorset transition (Desrosiers 2009; Ryan, this volume, chapter 32; Saville and Dyke 2014).

Despite these many advances, a considerable amount of Arctic archaeological research remains captive to the culture-historical paradigm, due to historical factors of excavation and the prevalence of undated legacy collections. This is particularly the case around Bering Strait, where the first two generations of researchers unearthed a disproportionate amount of the prehistoric sequence within large mound sites and literally filled museums with massive collections, some of which remain unanalyzed and undated to the present.

Environment and Climate Change

Since the initial exploration by Europeans in the sixteenth century, with Frobisher’s journeys north, climatic determinism has offered a facile, and appealing, narrative to explain cultural development in the Arctic. The primacy of culture over environment is more often than not the academic antidote to such reductionism, though it has the potential to be equally facile. Nonetheless, northerners are subject to the whims of variability in animal movements, which in turn are constrained by decadal to centennial and even millennial climate shifts.

To people living in the Arctic, the austere and vegetally depauperate environment enforces a monolithic reliance on animal protein (largely seal, whale, caribou, and fish). Two environmental polarities define the archaeology of the North American Arctic: an interior, in the Low Arctic, with abundant herds of caribou; and a perennially frozen ocean with its ice-dependent, often migratory, sea mammals. Over the entire Arctic, the possibilities in the interior rapidly decline to the north and east, almost to the vanishing point in parts of Greenland. This polarity is sometimes formalized as the “dual economy” or “dual adaptation” model for Arctic subsistence (McCartney and Helmer 1989), emphasizing the need for the products of both sea and land. In particular, the importance of caribou skins for optimal clothing, even for peoples whose other needs can be met largely from marine sources, is often discussed (Burch 1972; Stenton 1991). This duality has been a theme since at least as early as Steensby’s (1916) consideration of Inuit origins, though recent considerations emphasize that from earliest Paleo-Inuit times there has been a reliance on marine mammals in many regions (Darwent 2004).

Vagaries of weather can negatively impact both land and sea ecosystems; for example, a catastrophic decline in caribou numbers can occur if calving grounds are iced over. A great temptation is to produce an overarching theory of human territorial

organization and population dynamics linked to the cyclicity of the northern caribou herds (Gordon 1975). Certainly the nineteenth-century caribou collapse in northern Alaska proved catastrophic, but its roots lie largely within the adoption of the rifle (Burch 2012). A comparable maritime example exists in the potential for expansion of sea ice to negatively impact bowhead whale numbers in the central Arctic, which has been linked to the decline of Classic Thule whaling settlements (Savelle 1987).

The role of climate in explaining cultural change has varied across a spectrum from positive to negative. In the pioneering days, Arctic climate went largely unmentioned; coming out of the Little Ice Age, researchers assumed cold was an unchanging part of the Arctic. Certainly, they were aware that the Norse had entered the north during a warm interval, but believed that true Arctic cultures thrived in the cold. In the 1960s, the viewpoint altered to the perspective that warming opened up the High Arctic, leading to an influx of people into the High Arctic of the Canadian Archipelago and Greenland. The assumption was that the retreating sea ice led to extended ranges and larger numbers of sea mammals, and humans followed: first, those of the Early Paleo-Inuit (Pre-Dorset) period, ca. 5,200 years ago, then the Thule people, ca. A.D. 1200 (McGhee 1969–1970, 1981). Of note is the fact that no one ventured to unglaciated regions of the north during the even more profound early Holocene thermal maximum, around 10,000 years ago; such an absence must reflect an extreme dearth or absence of marine hunters in the Bering Strait and Alaskan North Slope regions.

The last 50 years have shown that the Arctic is not a perennial ice box, but is subject to drastic shifts in climate; the present onslaught of global warming is transforming environments across the region. When human-environment relationships are explored in the past, it is difficult to demonstrate causal relationships between climate change and cultural processes, and researchers must avoid the automatic assumption that warmer periods are better for human settlement. In some cases, it does appear that warmer periods allowed expanded settlement, as may, for example, be the case for the Late Dorset expansion to the High Arctic around A.D. 850 (Schledermann 1990). However, it is also evident that warming and reduction in sea ice can have adverse impacts on seal populations in many regions. This phenomenon was extrapolated by Mason and Barber (2003), who note that oceanic upwelling was intensified during the stormy cold periods of the Little Ice Age, with positive impacts on biological productivity. Studies of the complex interrelationships between climate and culture are currently seeing a resurgence, and will remain a central theme in Arctic archaeology for the foreseeable future.

Migration and Interaction

The Arctic ethnographic record reveals a region in which population movements were common, and local and regional groups were bound to their neighbors in complex networks of interaction. These two phenomena—migration and interaction—are fundamental to our understanding of the prehistory of the region as well, aided by their often high degree of archaeological visibility.

Migration, the movement by groups of people to new regions (as opposed to annual movements within a group's existing territory), was triggered by a variety of factors in the ethnographic record. In particular, migrants sought new economic opportunities (Krupnik and Chlenov 2009), or an escape from famine conditions (Burch 1978) or blood feuds (Burch 2005). These and other factors must have also influenced prehistoric migrations, which occurred at a variety of scales. Relatively small-scale movements are seen throughout the prehistoric record; most directly when regions are periodically abandoned and then resettled from elsewhere. This occurred in the High Arctic, for example, which saw settlement by Pre-Dorset, Independence I, Saqqaq, Early Dorset, Late Dorset, Thule Inuit, and nineteenth-century Inuit. In most cases, people who made the distinctive technologies associated with each of these named traditions clearly arrived from more southerly regions of the Arctic, rather than developing in situ. Likewise, interior regions of northern Alaska saw discontinuous occupation by a sequence of peoples including Denbigh Flint Complex, Norton, Ipiutak, and Thule. In both of these areas, the repeated reoccupation events are likely related to the "marginal" nature of the local environments, which could support local populations under optimal circumstances, but were also subject to occasional and unpredictable resource failures.

At the largest scale of migration, the western Arctic was the conduit for the initial peopling of North America via Beringia around 15,000 cal B.C., though this period is not emphasized in the present volume. More recently, around 3200 cal B.C., people of the Early Paleo-Inuit tradition (Arctic Small Tool tradition) migrated from Siberia to Alaska and the eastern Arctic. This migration, involving peoples referred to as Denbigh Flint Complex, Pre-Dorset, Independence I, and Saqqaq, led to the initial peopling of virtually the entire North American Arctic, and represents the first societies with the full technological, social, and ideological suite of characteristics needed to live on frozen northern coasts (Friesen, this volume, chapter 28). The migration episode with the greatest influence on the modern cultural map of the Arctic occurred around A.D. 1200. This period saw a dynamic expansion of Thule Inuit people originating in northwest Alaska, who traveled rapidly east to inhabit the entire Canadian Arctic and Greenland, eventually as far south as southern Labrador and the Quebec Lower North Shore. Their direct descendants are the modern peoples of most of this region.

"Interaction" is a catch-all term, including trade, information exchange, conflict, and intermarriage. Not all, however, are equally visible, and trade has always been the aspect of interaction easiest to reconstruct from the archaeological record, with the existence of trade taken as a proxy for the existence of other types of interaction. Ethnographically, in addition to European goods, trade occurred in a vast array of locally available materials including native copper, meteoritic iron, soapstone, animal skins, sea-mammal oil, walrus ivory, wood, and many others (Stefánsson 1914). Trade across Bering Strait in obsidian extends back nearly 5,000 years while the entry of iron occurred in the first millennium A.D. The technological and aesthetic impacts of iron, in particular, were immense and in some sense a cosmological event in that it catalyzed decorative art associated with shamanism. In some cases, the trade was probably necessary for the basic

wellbeing of the societies involved; for example, in northern Alaska, interior peoples traded with coastal people—the former receiving sea-mammal oil which was a critical dietary supplement, the latter receiving caribou skins necessary for optimal winter clothing (Spencer 1959). In other cases, trade served the purpose of reinforcing status hierarchies, by providing rare goods for display, or for redistribution (Sheehan 1985). In most instances, trade was also important as a mechanism for maintaining relationships between people in different regions—relationships which could be operationalized in times of stress or famine (cf. Wiessner 1982).

Interregional interaction also occurred in the form of conflict. In nineteenth-century northwest Alaska, Burch (1998) documented an Iñupiat system of regionally organized societies, or “nations,” which regularly engaged in intergroup conflict, in addition to other forms of interaction such as trade (see also Darwent and Darwent 2014). Organized interregional conflict, or at least “feuding,” extends over 1,000 years into the Alaskan past, where it is associated with the Old Bering Sea, Ipiutak, Birnirk, and Punuk periods (Bandi 1995), based on the presence of slate armor, high frequencies of arrowheads, and skeletal remains with embedded arrowheads (Mason 2012). Conflict, however, has notoriously low archaeological visibility, and therefore may have been important during other periods of Arctic prehistory as well. In particular, several authors have speculated that when Thule Inuit first migrated to the eastern Arctic around 1200 cal A.D., knowledge of conflict and aggressive interaction from their Alaskan homelands was in part responsible for the ease with which they displaced the Late Dorset people living in the east (Friesen 2000; McGhee 1997).

The central message of these studies is that the Arctic past cannot be grasped fully if it is viewed as a series of isolated peoples whose actions were determined solely by the distribution of locally available resources. Instead, with the exception of a few very extreme cases, past peoples can be understood only if the relationships among individuals, families, territorial groups, and even larger-scale cultural entities are reconstructed (Friesen 2013). These interactions of varying scales were necessary for the functioning of each participating society; and in fact, disruptions to interaction networks have been blamed for the collapse, or at least reduction in scale, of a number of societies, including Late Dorset (Appelt and Gulløv 2009) and Thule (Whitridge 1999).

TERMINOLOGY

Archaeologists have divided the culture history of the North American Arctic into a patchwork of spatial and temporal units. While researchers share an often colloquial understanding of the meaning of most terms, universal agreement is lacking on dividing and naming the principal periods. In this section we provide a simplified version of the relationships of named units to each other, to provide context for subsequent chapters. This discussion is presented in terms of the major overarching traditions (a term roughly equivalent to “cultures” or “periods”) present across the region (Figure I.1).

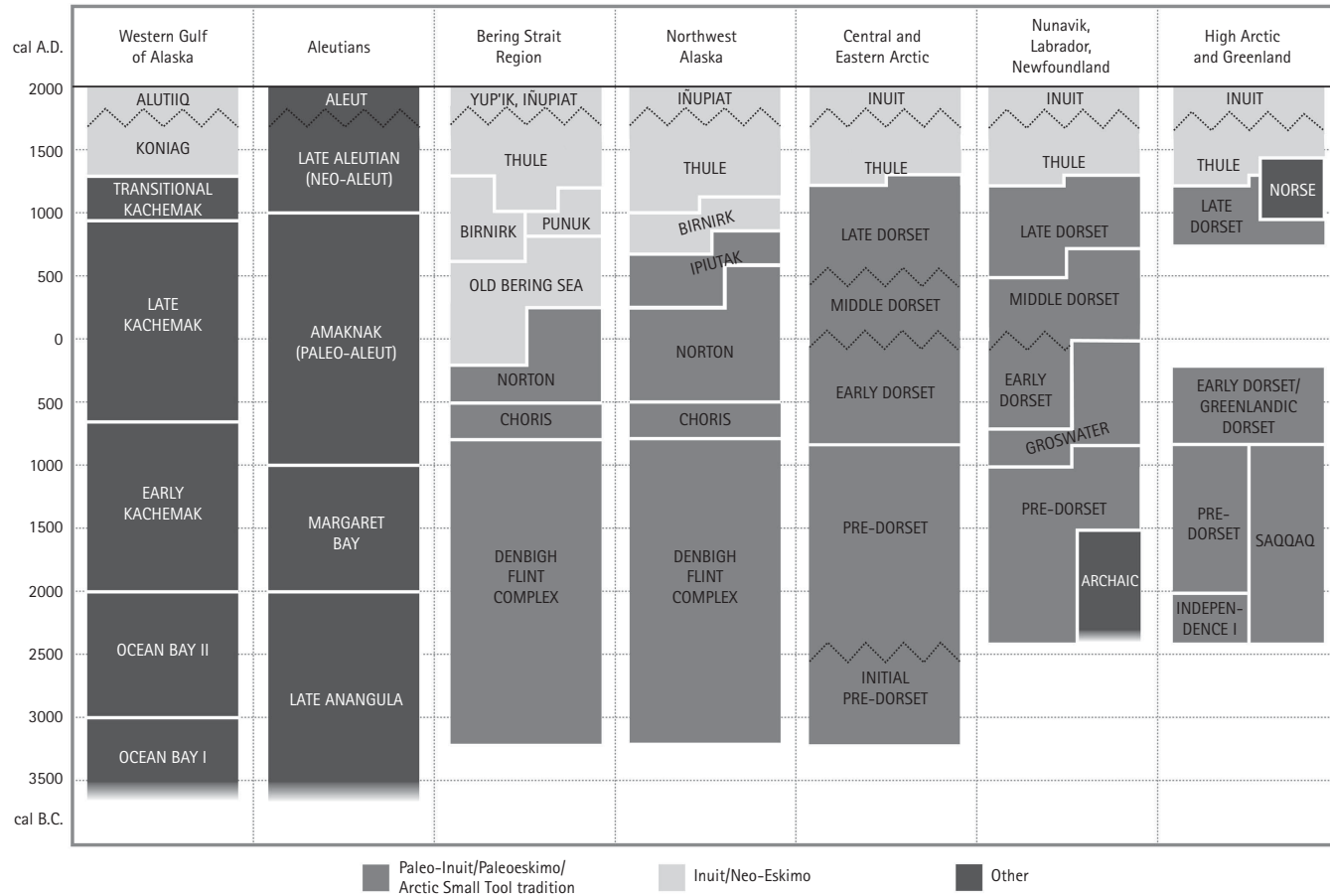


FIGURE 1.1 Major archaeological traditions in the North American Arctic over the past 5,000 years. Chart drafted by Matthew Walls.

Paleoindian and Northern Archaic (12,000–2000 cal B.C.)

While the High Arctic lacks evidence of occupation prior to ca. 5,000 years ago, more southern regions of Alaska, including parts of the interior Subarctic, Aleutians, and Gulf of Alaska, contain much earlier occupations. For these periods, various schools of thought construct cultural taxonomies based on differing criteria and historiographical backgrounds. Most definitions employ stone-tool morphology (bifacial or unifacial) or manufacturing sequences, such as the presence or absence of microblade technology or of distinctive spear-point styles. The most expansive division, coined in the 1970s, was termed the **Beringian tradition**, to emphasize the independent derivation of late Pleistocene large-mammal hunters; with the **Mesa complex** in northern and western Alaska ca. 12,000 cal B.C. and the mostly central Alaskan **Denali complex** of microblade technologists between 12,000 and 6000 cal B.C. To emphasize relationships with Siberia, some archaeologists recognize a **Diuktai** culture in Alaska, followed by **Sumnagin**, marked by large blades in the early to middle Holocene, 7000–5000 cal B.C. By contrast, in the last decade, the majority of researchers have used the term **Paleoindian** to delineate the earliest inhabitants of eastern Beringia (Alaska), emphasizing their ultimate fate as the colonizers of the Americas.

A technological break occurred around 6000 cal B.C., with the appearance of the **Northern Archaic tradition**, possibly from the south, equivalent to similar technologies across the Canadian Subarctic, including Labrador, where it is termed **Maritime Archaic**. This tradition persisted until the late Holocene and is typically associated, perhaps in error, with the spread of the boreal forest.

Some researchers in interior Alaska postulate long-term continuity by defining an **Athapaskan tradition** that includes both the earliest material, the **Chindadn complex**, and the latest occupations, through to the historic period. The latest cultural complex in the interior is **late Denali**, ca. 2500 cal B.C., a microblade-using culture with possible ties to the Northwest Coast.

Paleo-Inuit / Paleoeskimo / Arctic Small Tool / Norton (3200 cal B.C.–800/1300 cal A.D.)

The earlier of the two primary, pan-Arctic traditions originated with people of the **Bel'kachi culture** of the "Siberian Neolithic," who migrated eastward to the Bering Strait region and Alaska around 3200 cal B.C., or earlier. In Alaska, this earlier tradition is typically termed, in its entirety, the **Paleoeskimo** or, more widely in use, the **Arctic Small Tool tradition (ASTt)**, and consists of four subtraditions: the **Denbigh Flint Complex** (3200–800 cal B.C.), **Choris** (800–500 cal B.C.), **Norton** (500 cal B.C.–500 cal A.D.), and **Ipiutak** (250–800 cal A.D.). However, some researchers divide this tradition into two separate parts, with the ASTt referring only to the Denbigh Flint Complex, and the second part known as the Norton tradition, incorporating Choris, Norton, and Ipiutak.

In the eastern Arctic, this tradition is generally referred to as **Paleoeskimo** (also spelled **Palaeo-Eskimo**), though Friesen (2015) advocates its replacement with the term “**Paleo-Inuit**,” following Resolution 2010-01 of the Inuit Circumpolar Council. For present purposes, the terms **Paleo-Inuit** and **Paleoeskimo** have precisely the same meaning. In the eastern Arctic, the **Paleo-Inuit** period is often divided into **Early** and **Late** periods. **Early Paleo-Inuit** is occasionally referred to as **ASTt**, indicating its clear connections to Alaskan contemporaries, and represents a migration of **Denbigh Flint Complex** peoples from Alaska into the Canadian Arctic and Greenland. In the eastern Arctic, **Early Paleo-Inuit** consists of three cultures: **Pre-Dorset** (3200–800 cal B.C.) in the Canadian Low Arctic Islands and adjacent mainland; **Independence I** (2400–2000 cal B.C.) in the High Arctic Islands and northern Greenland; and **Saqqaq** (2400–800 cal B.C.) in east, south, and west Greenland. Following these **Early Paleo-Inuit** entities is a poorly understood intermediate period, including the **Lagoon Complex** (800–300 cal B.C.) in the Amundsen Gulf area of the western Canadian Arctic; **Groswater** (1000–0 cal B.C.) in Newfoundland, Labrador, and northern Quebec; and **Transitional, Early Dorset**, or **Greenlandic Dorset** (800–0 cal B.C.) in the central Canadian Arctic and Greenland. In the central Arctic, these earlier forms developed into **Late Paleo-Inuit**, which is synonymous with **Dorset** (800 cal B.C.–1300 cal A.D.) culture. **Dorset** is usually divided into **Early**, **Middle**, and **Late** periods, with **Late Dorset** disappearing shortly after 1300 cal A.D.

Inuit / Eskimo / Neoeskimo / Northern Maritime / Thule (200 cal B.C.–present)

The previous section outlined the earlier of the two main pan-Arctic traditions, which ended in the west around 800 cal A.D. with **Ipiutak**, and in the east around 1300 cal A.D. with **Late Dorset**. The more recent tradition, which supplanted these earlier peoples, is very different, and represents the direct ancestors of all modern **Inuit**, **Iñupiat**, **Inuvialuit**, and **Yupik** peoples. This tradition again does not have a single, universally agreed-upon name; rather it is called by different researchers the **Neoeskimo**, **Eskimo**, **Northern Maritime**, or **Thule tradition**. In the eastern Arctic, it is sometimes now simply called the **Inuit tradition**. This tradition arose in the **Bering Strait** region, with its earliest directly ancestral subunit known as **Old Bering Sea I**, equivalent to **Okvik**, followed by **Old Bering Sea II and III** (Old Bering Sea in total: 200 cal B.C.–700 cal A.D., possibly as late as 1400 cal A.D.), which developed into **Birnirk** (700–1300 cal A.D.) on the northern coasts of Siberia and northern Alaska and **Punuk** (800–1200 cal A.D.) in the **Bering Strait** region, and northern Alaska. Eventually, what is known as **Thule** developed mainly from **Birnirk** in northwest Alaska by around 1000 cal A.D., following which it developed gradually into recent **Yupik** and **Iñupiat** societies, respectively, in southern and northern Alaska. The “**Thuleization**” of southern Alaska is poorly known and may have involved in situ transformation rather than population replacement. After about 1200 cal A.D., **Thule** people expanded rapidly to the east, displacing **Dorset** culture in the eastern Arctic, and ultimately developing into modern **Inuit** groups.

The Aleutians and Kodiak (7000 cal B.C.–present)

On the Aleutian chain, cultural taxonomy emphasizes continuity and includes the **Anangula tradition** that extends from the earliest inhabitants around 7000 cal B.C. until 2000 cal B.C., with local phases distinguished; e.g., an early Anangula phase, succeeded by a late Anangula phase ca. 5000 cal B.C. The colonization of the western Aleutians occurred after 5000 cal B.C., and several technological shifts occurred around 2500 to 2000 cal B.C. Some researchers note sufficient similarity to define an ASTt tradition in the eastern Aleutians, Alaska Peninsula, and into southern Alaska. Local phase names are applied to the culture (Margaret Bay, Russell Creek, etc.) and some archaeologists even propose that ASTt originated in the Aleutians, rather than Siberia. Around 1000 cal B.C., with the appearance of the **Aleutian tradition**, there is a further drastic technological shift, subdivided into two periods: the **Amaknak** phase, between 1000 cal B.C. and A.D. 1000, and a late Aleutian phase, which opened ca. 1000 cal A.D. and continued until the presence of the Russians, around A.D. 1750, followed by the Americans in the later nineteenth century. The Aleutian tradition includes both the **Paleo-Aleut** and **Neo-Aleut** phenotypes, marked by a transition ca. AD 1000.

Archaeological terminology within the mostly treeless western Gulf of Alaska is widely agreed upon, with its initial inhabitants ca. 5500 cal B.C. considered the **Ocean Bay (OB)** tradition, subdivided into I and II at 3000 cal B.C. extending until ca. 2000 cal B.C. Around 2000 cal B.C., Ocean Bay II was succeeded by the **Kachemak** tradition, with its three phases (Early, Late, and Transitional), centered on Kodiak and extending into the southern Kenai Peninsula. Finally, around 1300 cal A.D., the **Koniag** tradition overtakes all of Kodiak Island, marking either a conquest by outsiders or the influence of the Thule tradition dominant at the time in Bristol Bay.

ORGANIZATION OF THIS VOLUME

This volume is divided into three sections. The first presents cross-cutting themes relevant to archaeology in all times and places across the Arctic. It contains chapters devoted to the social context of archaeology in relation to modern northern communities, the biological relationships among modern and past Arctic peoples, and networks of trade. Also in this section are chapters outlining the methodological particularities of Arctic research in relation to zooarchaeology, lithic analysis, and wood analysis.

The second and third sections of the book are based on the division of the North American Arctic into western and eastern regions. The western Arctic includes the central and northern Alaskan coasts and interior, the coast of the Chukotka Peninsula, and northwesternmost Canada, including the Mackenzie Delta region (Map I.1). The eastern Arctic includes the Arctic Archipelago, the adjacent mainland of Canada, and Greenland (Map I.2). For much of the Arctic past, this division is “real,” in the sense that there are clear cultural boundaries. For example, during the nineteenth century,



MAP 1.1 Selected archaeological sites in the western Arctic. (1) Ust-Belaia; (2) Cape Baranov; (3) Pegtymel' River; (4) Chertov Ovrage; (5) Vankarem Spit; (6) Koliuchin Island; (7) Dzhenretlen; (8) Neshkana; (9) Seshan; (10) Chegitun, Paipelghak; (11) Uten; (12) Uelen, Ekven, Naukan, East Cape; (13) Big Diomedes, Little Diomedes; (14) Enmyntyn, Chini; (15) Whale Alley; (16) Sireniki; (17) Nunligran; (18) Enmylen; (19) Birnirk, Utqiagvik, Kugusguruk, Walakpa; (20) Nunagiak; (21) Batemen; (22) Anaktuvuk; (23) Tukuto Lake; (24) Feniak Lake; (25) Onion Portage; (26) Hahanudan; (27) Ipiutak, Jabbertown; (28) Kivalina; (29) Cape Krusenstern; (30) Kotzebue; (31) Deering; (32) Trail Creek; (33) Cape Espenberg; (34) Wales; (35) King Island; (36) Safety Sound; (37) Qitchauvik; (38) Cape Denbigh; (39) Seveokok; (40) Kukulik; (41) S'keliyuk; (42) Punuk; (43) Anangula, Chaluka, Sandy Beach Bay; (44) Hog Island, Amaknak Island, Margaret Bay; (45) Tigalda Island; (46) Agayadan; (47) Adamagan; (48) Russel Creek; (49) Sapsuk River; (50) Hot Springs Village; (51) Bear River; (52) Takli Island, Mink Island; (53) Taginak Spring; (54) Karluk; (55) Brooks River; (56) Washout, Pauline Cove; (57) Engigstciak; (58) Kuukpak; (59) Kitigaaryuit.



MAP 1.2 Selected archaeological sites in the eastern Arctic. (1) Lagoon; (2) Nelson River; (3) Joss; (4) Clachan; (5) Bloody Falls; (6) Lady Franklin Point; (7) Bell, Cadfael, Buchanan, Ballantine, Ferguson Lake; (8) Pembroke; (9) Qariaraqyuk, Hazard Inlet; (10) Brooman Point; (11) Rolute; (12) Port Refuge; (13) Skraeling Island, Longhouse, Lakeview; (14) Old Nuullit; (15) Iita, David, Qeqertaaraq; (16) Ruin Island; (17) Pearylandville, Deltaterrasserne; (18) Kap Skt. Jacques; (19) Hvalros Ø; (20) Dødemandsbugten; (21) Itinnera, Tuapassuit; (22) Nipisat; (23) Qeqertasussuk; (24) Sermermiut, Qajaa; (25) Saqqaq; (26) Alarnerk, Abverdjar, Parry Hill, Freuchen; (27) Kapuivik (Jens Munk), Kaersut; (28) Nunguvik, Saatut; (29) Button Point; (30) Mittimatalik; (31) Crystal II, Shaymark; (32) Nanook, Tanfield, Closure; (33) Cape Dorset; (34) Naujan; (35) Native Point, T1, T2, T3; (36) Silumiut; (37) Seahorse Gully; (38) Gulf Hazard; (39) Arnapiik; (40) Tyara; (41) Qajartalik; (42) Diana Bay sites, Pointe-aux-Bélougas; (43) Nachvak Fjord, Ramah Bay; (44) Saglek Bay, Shuldham Island; (45) Eskimo Island; (46) L'Anse aux Meadows; (47) Port au Choix.

Alaskan Iñupiat and Inuvialuit of the Mackenzie Delta were much more similar to each other than either was to the adjacent Inuinnaït (“Copper Inuit”), who were the westernmost group in the eastern Arctic. During earlier periods, Early, Middle, and Late Dorset societies that inhabited the eastern Arctic were very different from their Choris, Norton, and Ipiutak contemporaries in Alaska, again indicating a real division between east and west. At the same time, this boundary between east and west was sometimes breached, or at least permeable, as seen for example in the Lagoon complex of around 800–300 cal B.C., whose material culture incorporated traits from both Alaska and the eastern Arctic; and also in the nineteenth century trade between Mackenzie Delta Inuvialuit (of the western region) and Inuinnaït (of the eastern region). It seems likely that additional instances of prehistoric interaction between west and east will be uncovered in the future; however, the division of east and west will remain central to an understanding of the North American Arctic as a whole. As a result, we have used this division to structure the remainder of the volume into two sections.

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PART I

CROSS-CUTTING
THEMES

CHAPTER 1

MOLECULAR GENETIC EVIDENCE FROM CONTEMPORARY POPULATIONS FOR THE ORIGINS OF NATIVE NORTH AMERICANS

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INTRODUCTION

THE reconstruction of the events associated with the demic expansion out of Asia and the settlement of the Americas is a complex puzzle that has been approached by specialists from a number of disciplines, using complementary methodologies and solutions. Archaeologists, through excavations of sites of habitation and radiocarbon dating methods, have provided a chronology of events and the direction of the settlement. Geologists, paleontologists, oceanographers, and ecologists have revealed opportunities for possible migration from Siberia by documenting the presence of the Beringian land bridge and the dynamics of glacial advances and recession. With technical developments in DNA extraction, amplification, and sequencing, molecular geneticists were last to join the fray on the controversies surrounding the origins of Native Americans. Initially, extant Siberian and Native American indigenous populations were compared for mitochondrial DNA haplogroups and sequences. As polymerase chain reaction (PCR) amplification methods were refined and better extraction methods developed, comparisons of ancient DNA with that of the living and more recently dead (based on skeletal remains) became possible. However, skeletal remains with amplifiable DNA are relatively scarce and often unavailable for scientific investigations. Given that

distributions and genetic diversity in extant populations reflect the history and evolution of human groups, together with archaeological and geological data they can be utilized to reconstruct the peopling of the Americas.

This chapter gives an overview of the molecular genetic evidence for the origins of Native American populations, focusing primarily on distributions of the uniparentally inherited mitochondrial DNA (mtDNA) and Y-chromosome markers in contemporary populations. Evidence from autosomal markers, which are inherited from both parents, is also discussed. In addition, the last section of this chapter provides an in-depth analysis of mtDNA sequence distributions in the Aleutian Islands and interprets these results in terms of patterns of migration and the actions of evolutionary processes.

DNA VARIATION IN CONTEMPORARY INDIGENOUS POPULATIONS

Early molecular genetic-based studies investigating the origins of Native American populations focused mainly on characterizing the diversity of the maternally inherited mtDNA lineages. These studies identified four major founding mtDNA haplogroups in the Americas—A, B, C, and D—that are defined by restriction fragment length polymorphisms (RFLPs) and a nine base-pair deletion, and are also associated with sequence variants in the first (HSV-1) and second (HSV-2) hypervariable segments of the mitochondrial control region (Table 1.1) (Lorenz and Smith 1996; Merriwether et al. 1995; Schurr et al. 1990; Shields et al. 1993; Torroni et al. 1992, 1993). Subsequently, a fifth founding mtDNA haplogroup, designated X, was identified at low frequencies in several North American populations (Bailliet et al. 1994; Brown et al. 1998). This classification scheme was later refined to reflect information obtained from sequencing the entire 16,569 base-pair mtDNA molecule. According to current classification, Native American mtDNAs belong to four major subhaplogroups—A2, B2, C1, and D1—which are defined by both control region and coding sequence mutations (Achilli et al. 2008; Fagundes, Kanitz, and Bonatto 2008; Tamm et al. 2007), along with a number of minor founding lineages, including: C4c, D2, D4b1a (formerly D3), D4h3, and X2a (Achilli et al. 2008; Malhi et al. 2010; Perego et al. 2009). As the number of whole mtDNA sequences increases, the haplogroup classification will likely undergo further revision.

The major founding haplogroups are distributed, in varying frequencies, among the indigenous populations of North, Central, and South America. Haplogroup A is present in higher frequencies in North American Amerindian populations; C and D are higher in southern Amerindians, and B is rare in North America (although some B and C lineages are found in northwest coast populations, and C is also present in some Alaskan Athapaskans); and haplogroup X is nearly exclusive to northern Amerindian populations, including Ojibwa, Nuu-Chah-Nulth, Sioux, and Yakima (Lorenz and Smith 1996; Merriwether et al. 1995; Torroni et al. 1992, 1993). Na-Dene and Eskimo-Aleut

Table 1.1 Definition of Native American Mitochondrial DNA Lineages (after Perego et al. 2010; O'Rourke and Raff 2010)

mtDNA lineage	HSV-I variants	HSV-II variants	Coding region variants
A (+ <i>Hae</i> III 663)	16290, 16319	152, 235, 235	663, 1736, 4248, 4824, 8794
A2	16111, 16362	64, 146, 152 reversion, 153, 522–523 deletion	8027, 12007
A2a	16192	64 reversion	3330
A2b	16265	64 reversion	
B (Region V 9 b.p. deletion)	16183C, 16189, 16519		8281–8289 deletion
B2	16217	499	827, 3547, 4820, 4977, 6473, 9950, 11177, 13590, 15535
C (– <i>Hinc</i> II 13259, + <i>Alu</i> I 13262, + <i>Alu</i> I 10287, + <i>Dde</i> I 10284)	16298, 16327	249 deletion	3552A, 4715, 7196A, 8584, 9545, 11914, 13263, 14318, 15487T
C1	16325	290–291 deletion, 522–523 deletion	
C1b		493	
C1c		reversal of 522–523 deletion	1888, 15930
C1d	16051	194	
C1d1			7697
C4			2232A, 6026, 11969, 15204
C4c	16245		11440, 13368, 14433, 15148
D (– <i>Alu</i> I 5176, + <i>Alu</i> I 10287, + <i>Dde</i> I 10284)	16362		4883, 5178A
D4			3010, 8414, 14668
D1	16325		2092
D2	16129, 16271		3316T, 7493, 8703, 9536, 11215
D2a			11959
D4b1a (formerly D3)	16319		951, 8020, 10181, 15440, 15951
D4h3a	16241, 16301, 16342	152	3336, 3396, 3644, 4052, 5048, 6285, 8946, 9458, 13135
X (– <i>Dde</i> I 1715, + <i>Hae</i> III 16517)	16189, 16278, 16519	153	6221, 6371, 13966, 14470
X2		195	1719
X2a	16183C, 16213	200	8913, 12397, 14502
X2g		153 reversion, 225	769, 5111, 9722, 13368, 15650, 15924

Note: The variants listed here are relative to the revised Cambridge reference sequence (Andrews et al. 1999) and are transitions unless otherwise specified. Transversions are indicated using letters to represent base changes. Restriction site gains and losses are given in parentheses.

populations have mainly haplogroup A and D lineages, and frequencies of A are particularly high in some of these populations, including 97 percent in the Haida, 100 percent in the Dogrib, 89 percent in North Slope Iñupiat, and 100 percent among East Greenland Inuit (Helgason et al. 2006; Lorenz and Smith 1996; Raff et al. 2015; Saillard et al. 2000; Starikovskaya et al. 1998; Torroni et al. 1992, 1993). Aleut lineages belonging to haplogroup A are highest for communities located in the eastern Aleutian Islands and the Alaska Peninsula, where frequencies range from 36 to 73 percent of all maternal haplotypes (Zlojutro et al. 2009). However, Aleuts in the western Aleutians and Pribilof Islands have a higher frequency of haplogroup D (73 percent), which is fixed in the transplanted Bering Island Aleut community in the Commander Islands, located to the east of the Kamchatka Peninsula (Derbeneva et al. 2002; Rubicz et al. 2003; Zlojutro et al. 2006). Haplogroup D is also present in some Eskimo populations, but at a lower frequency (i.e., 7 percent in North Slope Iñupiat, 7 percent in populations of western and southern Greenland, and 13 percent for Victoria Island inhabitants) (Helgason et al. 2006; Raff et al. 2015).

There is general agreement among molecular anthropologists that the five Native American founding haplogroups originated in Asia, where the present-day populations harbor these and other mtDNA types and they exhibit greater mitochondrial diversity than in the Americas. Mitochondrial haplogroups A, C, and D are found throughout Siberia, along with a number of other haplogroups that have not been characterized in Native Americans, such as F, G, M, U, Z, etc. (Schurr et al. 1999; Schurr and Wallace 1999; Starikovskaya et al. 1998; Torroni et al. 1993). Haplogroup B is prevalent among Southeast Asian populations and it is rare in Siberia, although it has been identified in a few southern Siberian groups including populations of the Altai, the Buryats and the Tuvans (Ballinger et al. 1992; Kolman et al. 1996). Similarly, haplogroup X, while absent from most Siberian populations, is also found in low frequencies in the Altai (Derenko et al. 2001). The presence of the five founding mtDNA haplotypes in this region indicates that southern Siberia is the likely homeland of a population ancestral to Native Americans. In addition, shared mtDNA lineages A2a and D2a among populations of North America and the Siberian Yupik and Chukchi suggests that northeastern Siberia is a more recent place of origin for Eskimo, Aleut, and Na-Dene populations (Volodko et al. 2008) or that there was gene flow among these populations after the initial peopling event(s).

Studies of the nonrecombining portion of the paternally inherited Y chromosome in Native Americans are generally consistent with those based on the analysis of mtDNA, but they provide lower-resolution information due to Y markers being less variable. The majority of Native American Y lineages belong to haplogroup Q, which is defined by the single nucleotide polymorphism (SNP) M242 (Seielstad et al. 2003). This haplogroup is found in populations spread out over a vast geographic range, and in addition to Native Americans, it is also present among Asians, Europeans, and North Africans. Haplogroup Q lineages with the M3 SNP belong to the subhaplogroup Q1a3a1 (designated Q3 in earlier publications), which is found throughout the Americas and in the Siberian Inuit (Karafet et al. 2008; Lell et al. 2002; Underhill et al. 1996). A smaller

number of paternal lineages belong to subhaplogroup C3b (defined by SNP P39), which is limited to North American populations, including the Cheyenne and Apache (Zegura et al. 2004).

Y-chromosome haplogroups Q and C were originally traced to populations in southern and eastern regions of Siberia, respectively (Karafet et al. 1999; Lell et al. 2002). However, analysis of the higher-resolution Y chromosome short tandem repeat (STR) data indicated that both of these haplogroups originated in the Altai region of southern Siberia, consistent with the mtDNA evidence (Dulik et al. 2012; Zegura et al. 2004). The Native American Y subhaplogroup Q1a3a1 may have originated in Beringia or within the Americas (Schurr and Sherry 2004). Decreased diversity of the Native American Y chromosomes compared to Asian paternal lineages indicates that the American founders experienced a genetic bottleneck as they migrated into the Americas. One limitation to working with Y-chromosome data is that there was a large amount of non-Native paternal gene flow into indigenous American populations that took place beginning with European contact that is evident among contemporary Native populations in the form of high frequencies of non-Native Y lineages (Graf et al. 2010; Mesa et al. 2000).

The use of autosomal markers in studies of Native American origins lagged behind the mtDNA and Y chromosome work and mainly consisted of single markers, until recently. Schroeder et al. (2007, 2009) described an autosomal D9S1120 repeat allele in populations throughout the Americas and in two populations of northeastern Siberia, the Chukchi and Koryaks. This supports the hypothesis that Native Americans have recent ties to Beringian populations, along with an earlier genetic connection to populations in central Siberia (Tamm et al. 2007). In a larger-scale study of autosomal diversity, Wang et al. (2007) characterized 679 microsatellites in 24 Native American populations. They demonstrated that compared to populations on other continents, Native Americans are genetically less diverse and more divergent. There is a marked decrease in autosomal variation as a function of increasing distance from the Bering Strait region, accompanied by a decrease in similarity to Siberian populations (Amos and Hoffman 2010; Wang et al. 2007). This points to a Siberian origin for Native Americans, followed by a population bottleneck or founder event during the initial colonization of the Americas that took place in the extreme northwest region of the continent. Hunley and Healy (2011) described the gradient of autosomal variation in the Americas as resulting from higher levels of non-Native male admixture in populations in the North, with decreasing levels among populations in the South. Despite a substantial level of European male admixture, the underlying genetic structure of Native Americans is still present and regional gene flow between neighboring indigenous populations has not obscured the macrogeographic genetic pattern. This points to the utility of autosomal markers for investigating the origins of indigenous Americans. Recent publications have greatly increased the number of autosomal markers available for Native Americans (Raghavan et al. 2015; Reich et al. 2012). Reich et al. (2012) characterized more than 300,000 SNPs for 52 Native American and 17 Siberian populations, and Raghavan et al. (2015) sequenced 31 modern genomes from the Americas, Siberia, and Oceania, along with 23 ancient genomes, and generated genome-wide SNP data for an additional 61 individuals from 27 populations (including Native Americans and Siberians).

COLONIZING MIGRATIONS INTO THE AMERICAS

There is a general consensus among anthropologists that the ancestral Native Americans migrated from their Asian homeland into the Americas by way of the Bering land bridge that connected northeastern Siberia and western Alaska during the last glacial maximum (LGM), approximately 18–21 thousand years ago (kya) (Crawford 1998). However, the number of migrations involved in the initial colonization of the American continent and details concerning the specific routes taken by these early settlers remain topics of debate.

In 1986, Greenberg et al. proposed a three-migrations model that was based on a synthesis of linguistic, morphological, and classic genetic evidence available at the time. According to their model, the earliest migration consisted of the ancestors of modern-day Amerindian speakers who populated South, Central, and much of North America; the second migration involved ancestors of the Na-Dene speakers of Alaska, Canada, the Northwest Coast, and the Southwest; and the third and final migration was of the ancestral Eskimo-Aleuts of the Arctic and Subarctic regions. Reich et al. (2012) provided additional support for this model in their analysis of genome-wide autosomal data, which they interpret as evidence for three migration events from Asia into the Americas, including a distinct migration of Na-Dene (represented by a single population, the Chipewyan). Critics of the Greenberg model included linguists, who objected to Greenberg's classification of diverse American languages into a single "Amerind" category (Campbell 1997). Other researchers have stated that the Greenberg model fails to accurately account for molecular variation observed in contemporary Native Americans, among them Hunley and Long (2005), based on their analysis of mtDNA sequences from 17 Native American populations. Raghavan et al. (2015), in a comprehensive study of autosomal diversity among Native American populations, also rejected the Greenberg model and instead suggested that Amerindians and Na-Dene entered the Americas as a single population that later split.

Peopling models based on analyses of mtDNA lineage diversity of Native Americans have variously interpreted the data as evidence for multiple migrations or a single migration into the American continent. Some studies suggested that there were two founding migrations, the first bringing mtDNA haplogroups A, C, and D, which are genetically diverse and widespread in the Americas, and a later migration bringing haplogroup B, which is nearly absent from Na-Dene and Eskimo-Aleuts (Schurr and Wallace 1999; Torroni et al. 1992, 1993). It has also been hypothesized that haplogroup X represents a migration separate from that which brought haplogroups A–D to the Americas (Perego et al. 2009; Smith et al. 1999; Torroni et al. 1993), or that there were multiple migrations, each carrying the full suite of haplogroups (Schurr 2004). Other studies interpret the mtDNA evidence as supporting a single migration into the Americas, based on calculations of similar diversity levels and coalescence dates for the founding haplogroups

(Bonatto and Salzano 1997; Fagundes, Kanitz, and Bonatto 2008; Forster et al. 1996; Kolman et al. 1996; Merriwether et al. 1995; Silva et al. 2002). The single-migration model has gained support among molecular anthropologists, although there is still no consensus on the topic.

A variation of the single-migration model is the Beringian incubation model, in which Beringia is hypothesized to have played a key role as the location where much of the genetic diversity specific to contemporary Native American populations arose. According to this model, the ancestral Native American population migrated to Beringia as early as 30 kya, corresponding with the oldest evidence for human habitation of Northeastern Siberia (represented by the Yana Rhinoceros Horn Site) (Kitchen et al. 2008; Mulligan et al. 2008; Pitulko et al. 2004; Tamm et al. 2007). There they remained in isolation from other Asians for a period of five to 20 thousand years (ky), during which they accumulated American-specific mutations, followed by a rapid expansion throughout the Americas. However, Raghavan et al. (2015) reported that, based on the analysis of autosomal data, there was no long-term isolation of the ancestral American population in Beringia, but rather there was evidence of gene flow with East Asian populations.

Upon reaching the Americas, the founding population is proposed to have migrated from Alaska further into North America via an inland route between the retreating Laurentide and Cordilleran ice sheets. Prior to ~14 kya ice sheets covered much of western Canada and would have impeded any population movement to the south. However, earlier expansion dates obtained from the molecular genetic data, along with a pre-Clovis Monte Verde site at the southern tip of the Americas dated to 14.5 kya (Dillehay 1997), necessitated an alternate peopling model. Rather than taking an inland route through the ice-free corridor, Fagundes et al. (2008) proposed that the early Americans migrated along the western coast of North America. In support of this, Perego et al. (2009) suggested that individuals with mtDNA D4h3 lineages traveled south along the Pacific Coast, while individuals with X2a lineages followed an inland route along the ice-free corridor.

After the initial colonization of the Americans, there is evidence for subsequent migratory pulses of humans into the continent. For example, a later migration may have introduced the mtDNA lineage D2 that is present today among Chukchi, Eskimo, Aleut, and Athapaskan populations (Derenko et al. 2007; Rubicz et al. 2003; Tamm et al. 2007; Zlojutro et al. 2006). Analysis of ancient DNA from a Paleoeskimo Saqqaq individual from Greenland points to yet another late migration into the Americas from Siberia. This individual had mtDNA type D2a1 that is common among Bering Island Aleuts and Siberian Sireniki Yuit and which, along with analysis of autosomal SNPs, indicates there was a long-range migration of people from Siberia, across the northern reaches of the American continent, and into Greenland around 5.5 kya (Gilbert et al. 2008; Rasmussen et al. 2010). As the Saqqaq individual was genetically distinct from both modern Native Americans and Inuit, he likely represents an independent migration into that region. There is also evidence for a back migration that carried mtDNA A2a lineage from northern North American populations to Siberian Evenks and Selkups, as this lineage appears

to be otherwise nested within an American-specific subclade (Volodko et al. 2008). These mtDNA studies, along with evidence provided by autosomal DNA markers (Raghavan et al. 2014; Reich et al. 2012), indicate there was recurrent gene flow among northern populations on either side of the Bering Strait after the initial entry of humans into the Americas.

TIME ESTIMATES BASED ON MOLECULAR MARKERS

Dating mtDNA and Y-chromosome lineages is important for making inferences about American colonizing events, and in particular for calculating the time of initial arrival and subsequent expansions throughout the continent. However, there are discrepancies among studies related to the coalescence estimates for Native American lineages that result from using different data sets and methodologies, including variation in molecular clock calibrations (Ho and Endicott 2008). Other factors that impact time estimates are substitution-rate heterogeneity and the effect of genetic drift on founding populations (Endicott and Ho 2008).

The first studies to date American mtDNA lineages estimated their ages at 20–35 kya, which is much older than the 13 kya date given by proponents of the Clovis-first model for the earliest human habitation of North America that is based on archaeological evidence. The molecular genetic age estimates were based on the accumulation of RFLP mutations that distinguished the major Native American mtDNA haplogroups from their Siberian counterparts (Torroni et al. 1992, 1993, 1994). Analysis of the mtDNA HSV-1 sequence data gave similar ages (15–35 kya) (Brown et al. 1998; Schurr and Sherry 2004). Estimates derived from coding sequence variation placed the American mtDNA lineages at 15–20 kya, with variability in these dates due in part to the type of substitutions used (e.g., all coding region versus only synonymous coding region substitutions). For example, Achilli et al. (2008) calculated coalescence dates for the major American subhaplogroups A2, B2, C1, and D1 at 18–21 kya (with an average of ~19 kya), corresponding with a settlement of the Americas just after the LGM. Fagundes et al. (2008) also provided evidence for strong population growth among Native Americans at this time, ~18 kya.

Of particular interest for northern Native American populations are time estimates derived from the analysis of haplogroups A and D because these represent the most common founding lineages present among Na-Dene, Eskimo, and Aleut populations. Achilli et al. (2008) calculated a coalescence date of ~17 kya for the entire A2 subhaplogroup, which is thought to have originated in Alaska and is found in the highest frequencies among Yupik Eskimos and Athapaskans (Volodko et al. 2008). Within the A2 subhaplogroup, A2a lineages of Athapaskans, Siberian Yupik, and Chukchi were estimated at 4.7 kya, while the A2b lineages of Yupik Eskimos, Chukchi, Eastern Canadian,

and Greenlandic Inuit, were estimated at 2.6 kya (Zlojutro et al. 2009). Raff et al. (2015), in an analysis of North Slope Iñupiat, obtained older dates of 7.2 kya for A2a and 10 kya for A2b, along with similar dates for D lineages present in that population. Volodko et al. (2008) estimated that at approximately 6.9 kya, a split occurred between the D2 lineages D2a1a (present in Na-Dene, Aleuts, Eskimos, and Chukchi) and D2a1b (present in Siberian populations). Aleut mtDNA lineages A2a1a (previously designated A7, and harboring the Aleut-specific mutation 162126G) and D2 were both dated to ~5.4 kya, and are considered to represent the formation of the modern Aleut population (Zlojutro et al. 2006).

The earliest estimates for the age of Native American Y-chromosome haplogroups varied widely, with dates ranging from 30 to 2.1 kya (Karafet et al. 1999; Ruiz-Linares et al. 1999; Underhill et al. 1996). This variation in Y-lineage age estimates among studies was due in part to differences in the molecular markers, the mutation rates (whether pedigree-based or evolutionary-based), and the samples that were used. The availability of higher-resolution markers and a more comprehensive sampling of Native American populations led to more accurate coalescence dates. Zegura et al. (2004) estimated the founding Y haplogroups at 10–17 kya, while Bortolini et al. (2003) estimated the initial settlement of the American continent at 14 kya (based on Y-chromosome STR diversity) and a similar estimate was given by Schurr (2004) of 13.8 kya (based on Y SNP data). Overall, coalescence dates for Native American Y-chromosome haplogroups Q and C are within the same general time frame as the estimates based on mtDNA.

Recent analyses of autosomal markers also provide time estimates for Native American populations. Raghavan et al. (2015) estimated that Native Americans and Koryaks (determined to be one of the closest groups genetically) split approximately 20–23 kya, and that Amerindians and Na-Dene populations split around 13 kya.

PHYLOGENETIC RELATIONSHIPS AMONG POPULATIONS OF THE FAR NORTH

The populations of North America clearly share close genetic affinities with the contemporary inhabitants of northeastern Siberia. Furthermore, there is molecular genetic evidence in support of a reexpansion of these northern populations after the initial colonization of the Americas. The mtDNA A2 subhaplogroup is proposed to have evolved in glacial refugia of North America, possibly in southern Alaska and along the Northwest Coast (Volodko et al. 2008). A2 is further divided into lineages A2a, shared among Na-Dene, Aleuts, Eskimos from North America and Siberia, and Chukchi populations, and A2b, which is found in highest frequencies in Canadian Eskimos. In contrast, mitochondrial subhaplogroup D2 appears to have arisen in southern Siberia somewhat earlier, ~26 kya (Tamm et al. 2007; Volodko et al. 2008). D2 is further divided into the D2a1a lineage of the Na-Dene, Aleuts, Eskimos, and Chukchi populations and the D2a1b

lineage of Evenki, Buryat, Yakut, and Mongolians (Derenko et al. 2007; Volodko et al. 2008). Mitochondrial lineages A2a, A2b, and D2a1a distinguish the Beringian populations from the rest of the Americas, and also from all other Siberians, indicating that the mutations specific to these lineages may have arisen in the Bering region after the initial peopling of the Americas (Volodko et al. 2008). The sharing of these mtDNA types was likely due to recent shared common ancestry and to recent gene flow among these populations of the far North.

The Na-Dene populations are grouped together based on their shared language phylum, and include speakers of the Haida, Tlingit, and Eyak language isolates of the northwest coast, and speakers of the larger Athapaskan language family (Ruhlen 1991). Mitochondrial haplogroup A is predominate in these populations. Among the Pacific Northwest coast groups, haplogroups C and D, and lower frequencies of B and X are also present. The Subarctic Athapaskan populations of Alaska and Canada mainly have mtDNA A lineages, while Athapaskans in the Southwest, the Apache and Navajo, have high frequencies of B and C, in addition to A lineages (Lorenz and Smith 1996; Malhi et al. 2003). Based on archaeological and genetic data, the Southwest Athabaskans appear to represent a more recent migration into that region from the Subarctic, where they likely acquired haplogroups B and C as the result of admixture with surrounding non-Athapaskan populations. A phylogenetic relationship between the Na-Dene and the Yeniseian speakers of southern Siberia, of whom Kets are the only extant members, was proposed based on the analysis of linguistic data (Ruhlen 1998; Vajda, 2010a, 2010b). However, the analysis of mtDNA, Y-chromosome markers, autosomal locus D9S1120, classic genetic markers, and dental characteristics does not support this hypothesis, and instead groups the Kets with neighboring Siberians, while the Na-Dene speakers cluster with other indigenous North American and Northeastern Siberian populations (Rubicz et al. 2002; Scott and O'Rourke 2010).

Eskimo populations are geographically distributed along the Arctic and Subarctic regions of Siberia, Alaska, Canada, and Greenland, and while they are linguistically distinct from the Na-Dene speakers (their languages belong to the Eskimo-Aleut language phylum), genetically they share some similarities, including mtDNA subhaplogroups A2 and D2. Archaeological evidence indicates that there was a Paleoeskimo expansion from Beringia into the Eastern Arctic approximately 4,500 years ago. Mitochondrial lineages A2, D2, and D4b1a are present in contemporary Siberian and Alaskan Eskimo populations, while the Greenlandic and Canadian Inuit are genetically less diverse, as they lack the D2 subhaplotype (Helgason et al. 2006; Saillard et al. 2000). However, identification of the D2a1 lineage in the ancient Saqqaq individual from Greenland demonstrates that this subhaplotype was present among the earlier Paleoeskimos inhabitants of the Eastern Arctic (Gilbert et al. 2008). This apparent genetic discontinuity between ancient and modern populations supports the theory that there was a population replacement in the Eastern Arctic by a Neo-Eskimo Thule population expansion from the Bering region approximately 800 to 1,000 years ago.

The modern Aleut population is genetically most closely related to the Chukotkans (Siberian Eskimo and Chukchi), mainly due to shared D2a1a mtDNA lineages, and they

are genetically distinct from the Koryak and Even of the Kamchatka Peninsula (Rubicz et al. 2003, 2010; Volodko et al. 2008; Zlojutro et al. 2006). Although Aleuts are not as similar genetically to the Alaskan Yupik, there is evidence for gene flow from the Alaska Peninsula into the eastern Aleut communities, based on the presence of higher frequencies of mtDNA sublineage A2, which is common among the Alaskan Yupik and Athapaskan populations (Raff et al. 2010, 2011; Zlojutro et al. 2009). Haplotype D2a was also recently described in Inupiat from the Alaskan North Slope (Raff et al. 2015).

There is a large amount of non-Native male admixture in Native American populations, which, along with population relocations and decimation, has obscured the paternal phylogenetic relationships among these groups. In particular, there are high levels of the European Y-chromosome haplogroup R in indigenous North American populations, accounting for up to 73 percent of male lineages in Athabaskan populations (Malhi et al. 2008). The frequency of European Y chromosomes in Greenland Eskimos is 58 percent, and these are primarily of Scandinavian origin (Bosch et al. 2003). Among the Aleuts, 84 percent of the Y chromosomes are of non-Aleut origin, due largely to Russian, Scandinavian, and Western European male admixture, which appears to have obscured any relationship between native paternal genes and geography that may have existed previously (Crawford et al. 2010; Graf et al. 2010; Zlojutro et al. 2009).

MTDNA DISTRIBUTIONS IN CONTEMPORARY POPULATIONS: LESSONS WE CAN LEARN

Only two of the five founding mtDNA haplogroups observed in both Siberia and the Americas, A and D, are found in contemporary populations of the Aleutian Islands. Figure 1.1 documents the existence of clinal variation in the frequency of haplogroup A, which reaches its highest incidence in Alaska and the eastern Aleutians, and diminishes in the western islands and Siberia. However, Raff et al. (2010) demonstrated the presence of the B haplogroup in aDNA from skeletal remains found at the Brooks River site of the Alaska Peninsula. This haplogroup is absent in the contemporary Aleut populations.

Analyses of the geographic distributions of mtDNA sequences along the Aleutian archipelago reveals the existence of a high correlation between geography and genetics (Crawford et al. 2010). This relationship was demonstrated by comparing matrices using geographic distances (in km) with genetic distances (Mantel 1967). The distances were based on a total of 11 Aleut populations, plus mainland Siberian and Alaskan indigenous groups (see Figure 1.1). The relationship between geography and genetics was highly significant, with an $r = 0.72$ and $P < 0.000$ (Crawford 2007). On one hand, such a relationship would not be surprising when the linearity of the islands across 1200 km. is considered. However, on the other hand, what makes the correlation remarkable is the history of the Aleutian Islands with major depopulation following Russian Contact (from ~20 to 2 kya), massive relocations of Aleuts from the western and central islands

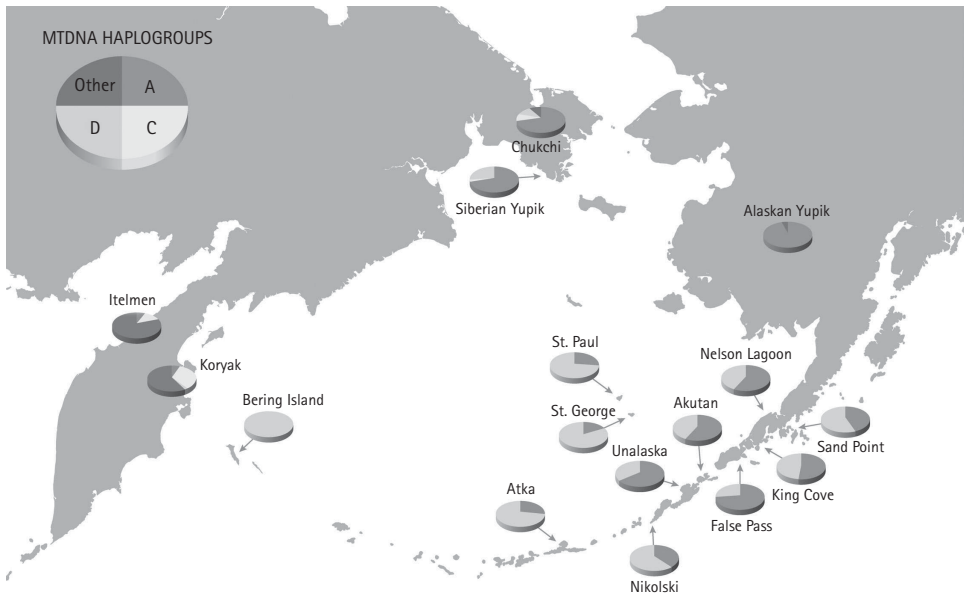


FIGURE 1.1 Geographic distribution of mtDNA haplogroups in the Aleutian Islands (Crawford 2007).

Figure by Kenneth Crawford, 2015

to the Pribilof and Commander Islands, and Japanese occupation during the Second World War and the evacuation of Attu by the Japanese and several island populations to mainland Alaska by the Allies (Rubicz et al. 2003). In addition, there was considerable genetic admixture with Russians in the western and central islands and with English and Scandinavians in the eastern islands (Graf et al. 2010; Zlojutro et al. 2009).

Several analytical methods, such as spatial autocorrelation, SAMOVA, and triangulation plot using Monmonier algorithm (Figure 1.2), reveal considerable genetic discontinuity in the distribution of mtDNA sequences of contemporary populations of the Bering region (Crawford et al. 2010). At least three genetic barriers were revealed: (1) between mainland Alaskan populations (Na-Dene and Eskimo) and the Aleut Island populations; (2) between Kamchatkan indigenous populations and the Aleuts (this latter barrier supports the interpretation that the Aleutian Islands were initially settled from the east to the west, instead of island hopping from Kamchatka to the western islands); and (3) in the central region, separating the eastern from the central islands. Apparently, this genetic discontinuity reflects the later colonization of the central islands from the East, approximately 6,000 years ago, during the coldest climatic period of the Holocene (Crawford and West 2012). The earliest migration of Aleuts across the Alaska Peninsula occurred 8,500 to 9,000 years ago and is associated with the receding glaciers and the inundation of Beringia. The chronology of the earliest habitation of the Aleutian Islands can be found in the early Anagula-phase occupation of Hog Island and Unalaska (Davis and Knecht 2010). Apparently the early settlers paused in

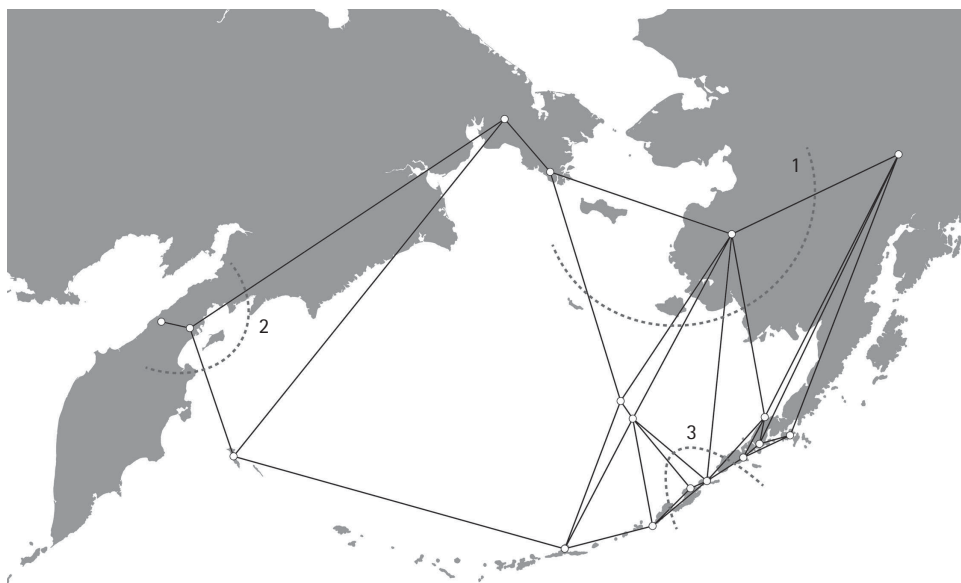


FIGURE 1.2 Triangulation plot using the Monmonier algorithm for identifying genetic discontinuities and barriers (Crawford et al. 2010).

Figure by Kenneth Crawford, 2015

the eastern islands until the coldest climatic interval in the central Aleutians 6,500 years ago. This cold interval coincides with high biodiversity and particularly the presence of cold-tolerant cod (Crawford and West 2012). The western islands remained unsettled until 3,500 years ago, which coincides with another climatic fluctuation—a cooler but drier period, accompanied by weakened cyclonic activity, less wind and reduced wind speeds and calmer seas. These climatic factors enabled the long-distance voyages by families in umiaqs across the wide expanses between the western islands. These inter-island passages require transit of up to 221 km in extremely rough seas that separate Rat from the Near islands. The genetic discontinuities and barriers observed in contemporary distributions of mtDNA sequences reflect the climatic fluctuations and periods of stasis and genetic differentiation. Thus, the geographic distribution of genes in Aleut populations reflects the dynamics of population expansions.

An in-depth analysis of the relationship between geographic and genetic distances was conducted using spatial autocorrelation (Bertorelle and Barbujani 1995). The genetic component was measured by product-moment coefficients, analogous to Moran's I , while each population is included in geographic distance classes, varying from 500 km to 2,500 km. The highest correlation among populations was in the 500 km distance class, followed by lower correlations at greater distances. Correlograms with negative slopes relative to increasing geographic distance classes are suggestive of kin migration (see Figure 1.3). In contrast, if the correlations of geography and genetics decreased but remained positive, this would best fit the isolation-by-distance model. Thus, the Aleutian Islands were settled through kin migration, which resulted in loss

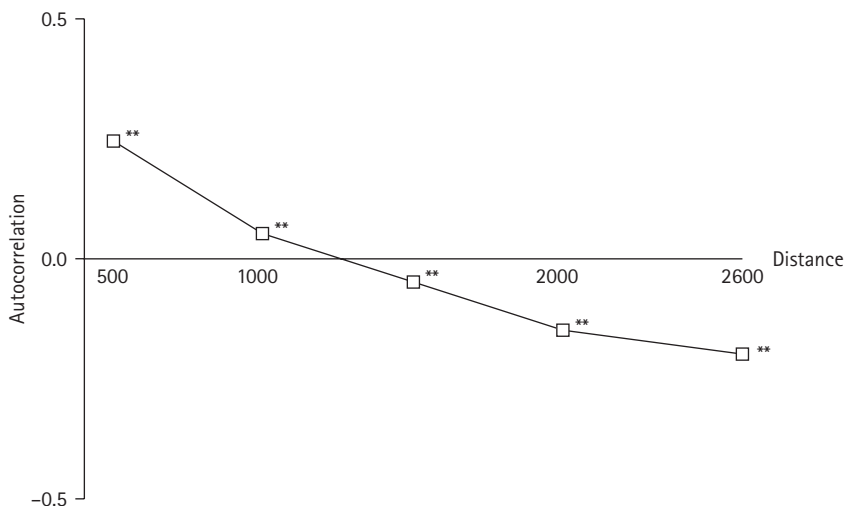


FIGURE 1.3 Spatial autocorrelation plot of the populations of the Bering Straits region using mtDNA sequences and the methods of Bertorelle and Barbujani (1995) (Crawford et al. 2010).

Figure by Kenneth Crawford, 2015

of genetic diversity observed in contemporary groups along an east-west axis. The research on ancient mtDNA in the Alaska Peninsula demonstrated the presence of B haplogroup in ancient populations, but this haplogroup was lost in contemporary populations through kin migration and stochastic processes (Raff et al. 2010). Similarly, the D haplogroup was fixed in the transplanted Aleut population of Bering Island (Rubicz et al. 2010). Thus, patterning and distributions of genes in contemporary populations can provide a glimpse of our evolutionary and demographic history. The most complete picture of our past can be reconstructed by utilizing archaeological, molecular genetic (both in living and ancient populations), ecological, and morphological information.

CONCLUSION

What does the molecular genetic evidence in contemporary Native American and Siberian populations tell us about the origins and settlement of the Americas? The molecular data offers us the following insights:

- (1) The sharing of both mtDNA and Y-chromosome founding markers among Siberian and Native American indigenous populations clearly demonstrates that Siberians migrated across Beringia into the Americas during the Pleistocene.
- (2) Whole-genome sequencing and the clustering of a 4,000-year-old Saqqaq Greenland Paleoeskimo with Siberian populations instead of Inuits suggest a later migration from Siberia to Alaska, Canada, and Greenland (Rasmussen

- et al. 2010). This is contrary to recent publications, which have claimed there is unanimity among scholars in regard to a single migration from Siberia to the Americas (Long and Bortolini 2011).
- (3) Estimates of coalescence dates for Native American mtDNA and Y-chromosome haplogroups point to a population expansion event between 15 and 18 kya, associated with a pre-Clovis settlement of the Americas and coastal migration, followed by a later expansion of circum-Arctic populations.
 - (4) Spatial autocorrelation and MATFIT analyses of mtDNA sequences are indicative of a sequential, east-to-west, movement of kin groups of Aleuts influenced by climatic and environmental factors. The expansion of Siberians across Beringia was followed by a westerly migration along the archipelago, punctuated by changes in climate and environment.
 - (5) The migrant populations into the Americas experienced the loss of genetic diversity as exemplified by the clinal distribution of mtDNA haplogroups in the Aleutian Islands and the fixation of D haplogroup in the population of Bering Island. In some instances, this reduction in genetic diversity is blurred by the massive gene flow from Europeans.

These five examples illustrate the lessons about the peopling of the Americas that we can learn from the examination of the distributions of genes in contemporary populations.

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CHAPTER 2

ANCIENT DNA AND STABLE ISOTOPES

Windows on Arctic Prehistory

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INTRODUCTION

WITH the introduction of molecular technologies, anthropology gained powerful tools to study the intimate details of the human past. Ancient DNA (aDNA) analysis is concerned with the DNA sequences from human or faunal remains obtained from archaeological or paleontological excavations for comparison with other ancient population genetic profiles or those derived from modern populations. This approach allows researchers to observe the genetic history of modern populations, rediscover the genetic signature of a prehistoric population, and track genetic variation across time and space. Similarly, the documentation and study of stable isotopes of carbon and nitrogen in ancient skeletal samples permit reconstructing past local ecologies and human dietary practices, thereby deriving more direct inferences regarding resource acquisition strategies and health.

In this chapter, we will review what stable isotope and aDNA studies have contributed to our understanding of human diets, predator-prey relationships, and the adaptation of Arctic and Subarctic peoples to northern environments. We briefly review modern patterns of genetic variation among Circumarctic and Beringian populations, identify how they are distinct from other Native American groups, examine what temporally and geographically provenienced aDNA samples have already taught us about Arctic prehistory, and how Arctic population genetic structure has changed over time. We will also note what nonhuman aDNA studies have contributed to our understanding of Arctic peoples.

STABLE ISOTOPE ANALYSIS AND RECONSTRUCTION OF ARCTIC DIETS

Recently published stable isotope and radiometric studies of mortuary assemblages ($n = 261$) from several prehistoric and one historic context in the Arctic allow us to review dietary, temporal, mortuary and climatic patterning across a range of ecological settings. Hudson Bay Dorset economic patterning is represented by merely two burials, reflecting the paucity of Dorset remains. Mortuary collections from two Thule sites on northwest Hudson Bay represent eastern Arctic “whaling” economies dating to the late Medieval Climatic Anomaly, whereas the Native Point Sadlermiut across Roes Welcome Sound from the whaling villages document local foraging strategies after the onset of Neo-Boreal cooling. Two historic individuals in the Sadlermiut collection illustrate the effects of the addition of European foods to Arctic diets (Coltrain 2009, 2011; Coltrain et al. 2004). Mummified remains from two burial caves in the eastern Aleutians and midden inhumations from Umnak Island represent prehistoric foraging strategies on the island chain, the latter with more than three millennia of time depth (Byers et al. 2011; Coltrain 2010a; Coltrain et al. 2006). We lack data from inland sites and the Alaska Peninsula is sparsely represented by a small number of individuals from two coastal and one upland site (Coltrain 2010b).

Descriptive statistics and temporal ranges are compiled in Table 2.1. Collagen stable isotope values and radiocarbon dates on individual burials and the stable isotope chemistry of faunal assemblages used to reconstruct their diets are reported in the publications cited above. All human and faunal samples meet established criteria for adequately preserved bone collagen. As per Table 2.1, site mean and median $\delta^{13}\text{C}$ values are within 0.2‰ indicating that within-group stable carbon isotope ratios are relatively normally distributed. Standard errors are low and in eight cases within the range of experimental uncertainty ($\pm 0.1\text{‰}$) suggesting that mean values well represent central tendencies. The range of $\delta^{13}\text{C}$ values for each group does not exceed 2.5‰, illustrating relatively uniform within-group reliance on marine versus terrestrial resources. Site mean and median $\delta^{15}\text{N}$ values are also within 0.2‰ and standard errors are low, but standard deviations are more varied and ranges larger, in every case exceeding the variation present in $\delta^{13}\text{C}$ values. In the Aleutians, variation in $\delta^{15}\text{N}$ tracks reliance on high versus low trophic level marine foods. In settings where caribou (*Rangifer tarandus*) and other terrestrial taxa are present, variation is more heavily structured by intake of marine versus terrestrial prey.

Confidence interval median dates and two sigma ranges provide approximate temporal spans for eastern Arctic and Aleutian mortuary assemblages. All individuals predate European contact with the exception of two historic Sadlermiut burials discussed below. However, the Alaska Peninsula sample is too small to adequately represent the temporal range of sites from which these burials were taken. Brooks River sites were occupied at least as early as the second century B.C. (Dumond 1987), and Workman (1966)

argues that Port Moller was occupied throughout the prehistoric period. Moreover, the short temporal span of Mink Island burials is in accord with only the most recent dates obtained from greater than seven meters of cultural deposits.

Among a subset of Aleutian and eastern Arctic burials, the carbonates in bone apatite were analyzed for $\delta^{13}\text{C}_{\text{apt}}$ and $\delta^{18}\text{O}$. Apatite/collagen spacing is typically in the +5‰ range in human diets where C_3 foods make up the bulk of dietary intake and carbohydrates supply energy (Froehle et al. 2010; Kellner and Schoeninger 2007); but in high-latitude diets devoid of carbohydrates, lipids are metabolized for energy. Because lipids are isotopically depleted relative to carbohydrates and protein, apatite/collagen spacing narrows. Arctic and Aleutian foragers acquire lipids primarily from sea mammals and spacing is typically narrowest among groups with the most enriched $\delta^{15}\text{N}$ values, in accord with heavy reliance on high trophic level marine taxa such as pinnipeds. Data summarized in Table 2.1 are similarly patterned. $\delta^{18}\text{O}$ values derive primarily from the stable oxygen isotope chemistry of drinking water, which covaries with the temperature of meteoric water (Froehle et al. 2010). Thus, the depleted $\delta^{18}\text{O}$ values for eastern Arctic burials reflect the location of these sites just a few degrees below the Arctic Circle at 64° north latitude; whereas individuals from eastern Aleutian sites at ~54° north latitude exhibit $\delta^{18}\text{O}$ values more positive by approximately 5‰.

Eastern Arctic

The two Dorset individuals reported here and in Coltrain et al. (2004) date to the early to mid-first millennium A.D. The T-1 burial was recovered in the 1950s by Collins (1956) from the Tunermiut site on Southampton Island in Hudson Bay and the Tyara burial by Taylor (1968) from the western shore of Sugluk Island in Hudson Strait. Both express diets dominated by high trophic level marine foods such as bearded seal (*Erignatus barbatus*) and ringed seal (*Phoca hispida*), which exhibit mean stable carbon and nitrogen isotope values approximately a trophic level below that of the Dorset (Coltrain et al. 2004: Table 3). Common eider ducks (*Somateria mollissima*) have stable isotope values similar to the pinnipeds and likely made a seasonal contribution to Dorset diets, whereas caribou and muskoxen (*Ovibos moschatus*) seem to be virtually absent from these diets and, if in the diet at all, bowhead whale (*Balena mysticetus*) and walrus (*Odobenus rosmarus*) made minor contributions.

Although the isotope chemistry of two burials cannot be thought to represent the entire Dorset temporal span or range of foraging strategies, our Dorset stable isotope data are similar to that of the protohistoric Mansel Island burial (Oschinsky 1960) and are within the range of the protohistoric Sadlermiut who postdate them by a millennium. Sadlermiut diets are higher in trophic level and more uniform than eastern Arctic burials from the whaling villages, with marine taxa such as pinnipeds and sea birds making up more than 90 percent of the diet and little evidence for exploitation of bowhead whale or caribou. Unique to Native Point among the sites in this study are two individuals dating from the historic period and exhibiting diets significantly

Table 2.1 Descriptive Statistics and Temporal Ranges for Stable Isotope Samples

Sites	n	Avg coll $\delta^{13}\text{C}\text{‰}^a$	Median	Std Error	Range	Avg $\delta^{15}\text{N}\text{‰}$	Median	Std Error	Range	Cal Conf Interval Median Dates	Calibrated 2 σ Ranges	n	Avg Apt $\delta^{13}\text{C}\text{‰}^a$	Avg Apt $\delta^{18}\text{O}\text{‰}^a$	Apt/Coll Spacing
Eastern Arctic															
Sadlermiut-Prehistoric	45	-13.2 ± 0.3	-13.2	0.1	1.7	20.6 ± 0.7	20.5	0.1	3.2	A.D. 1397–1758	A.D. 1305–1895	21	-11.4 ± 0.5	-12.6 ± 0.7	1.8
Sadlermiut-Historic	2	-16.1 ± 0.3	-16.1	0.2	0.4	14.3 ± 0.4	14.3	0.3	0.5	A.D. 1748–1764	A.D. 1624–1953				
Kamarvik	45	-14.2 ± 0.4	-14.2	0.1	2.4	18.3 ± 1.3	18.3	0.2	7.0	A.D. 1234–1683	A.D. 1078–1819	20	-11.6 ± 0.7	-12.9 ± 0.8	2.5
Silimiut	64	-14.5 ± 0.4	-14.5	0.1	2.0	16.9 ± 1.2	17.1	0.2	6.4	A.D. 1200–1623	A.D. 1065–1801	25	-11.8 ± 0.7	-13.1 ± 0.5	2.7
Imaha	1	-14.0				18.5				A.D. 1472	A.D. 1406–1584				
Mansel Island	1	-13.4				20.3				A.D. 1745	A.D. 1644–1884				
Angekok	1	-14.5				18.1				A.D. 1111	A.D. 1033–1204				
T-1 Dorset	1	-13.9				20.3				A.D. 541	A.D. 431–650				
Tyara Dorset	1	-12.9				20.8				A.D. 229	A.D. 92–383				
Eastern Aleutians															
Kagamil	32	-12.7 ± 0.3	-12.9	0.1	1.3	20.3 ± 0.6	20.3	0.1	2.4	A.D. 1034–1564	A.D. 890–1667	23	-11.4 ± 0.7	-7.8 ± 0.6	1.3
Shiprock	16	-12.4 ± 0.5	-12.3	0.1	2.1	20.4 ± 1.0	20.4	0.3	4.0	A.D. 1111–1462	A.D. 997–1580	16	-11.0 ± 0.5	-7.8 ± 0.4	1.4
Chaluka Midden-Early	6	-12.9 ± 0.6	-13.1	0.2	1.5	19.4 ± 0.6	19.5	0.2	1.8	B.C. 1485–309	B.C. 1645–133	5	-11.9 ± 0.7	-7.1 ± 0.4	1.2
Chaluka Midden-Late	26	-12.1 ± 0.4	-12.0	0.1	1.6	19.2 ± 0.6	19.3	0.1	2.5	A.D. 426–1557	A.D. 264–1666	14	-10.5 ± 0.8	-7.2 ± 0.5	1.7
Alaska Peninsula															
Brooks River	9	-15.0 ± 0.3	-14.9	0.1	1.0	17.4 ± 0.5	17.4	0.2	1.4	A.D. 611–1457	A.D. 466–1569				
Port Moller	7	-13.8 ± 0.7	-13.9	0.3	2.2	18.6 ± 2.5	18.6	1.0	8.5	B.C. 1431–A.D. 421	B.C. 1598–A.D. 562				
Mink Island	7	-13.1 ± 0.4	-13.0	0.1	1.0	18.5 ± 0.7	18.5	0.3	1.8	A.D. 1362–1541	A.D. 1284–1658				

^a $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ values reported in V-PDB.

lower in trophic level with $\delta^{13}\text{C}$ values indicating limited reliance on marine foods. In Coltrain et al. (2004:53) and Coltrain (2011), we argued that either these individuals were not indigenous to Native Point or consumed diets partially comprised of European staples provided at whaling stations in exchange for labor (Keenleyside 1990).

The Imaha and Angekok burials (Laughlin and Taylor 1960), as well as those from the whaling villages Kamarvik and Silimiut (McCartney 1977), on the northwest coast of Hudson Bay, are Thule in age and indicate people subsisted on mixed marine and terrestrial diets. Linear mixing model calculations constrained by directly measured Silimiut faunal, end-member isotope values produced a diet comprised of approximately 64 percent ringed seal, 19 percent bowhead whale, and 16 percent caribou, with the last increasing slightly in importance over time (Coltrain 2009). Results do not imply that these were the only taxa taken but instead estimate relative reliance on the most commonly exploited prey species making up the bulk of dietary intake. Most individuals from both sites date from the fourteenth to sixteenth centuries, postdating the Classic Thule period, and both sites appeared recently abandoned early in the seventeenth century.

The Aleutians

Hrdlička (1945) removed mummified remains from Kagamil and Shiprock, dry caves adjacent to Umnak Island in the eastern Aleutians. His interest was in the craniometrics of these burials, as well as remains found in Chaluka midden on Umnak Island. He argued that Chaluka midden inhumations represented an early, dolicho-cranic Paleo-Aleut form subsequently replaced by brachycranic Neo-Aleuts ca. A.D. 1000, such as those interred at Kagamil and Shiprock. In Coltrain et al. (2006), it was shown that Paleo-Aleuts did indeed have deep time depth in the eastern Aleutians, some dating to the mid-second millennium B.C., and Neo-Aleuts appeared to enter the island chain at ca. AD 1000; but Paleo-Aleuts were not replaced by incoming Neo-Aleuts. Both groups coexisted until Russian contact, yet were characterized by strikingly different mortuary practices (i.e., elaborate mummification rituals [Frohlich and Laughlin 2002] versus simple inhumations) and diets that differed with respect to both trophic level and foraging range. Mummified individuals interred at Kagamil and Shiprock, primarily Neo-Aleuts, accessed higher trophic level marine foods in general, taking more cetaceans, pinnipeds, and open-water fishes than Paleo-Aleuts. These results in combination with differences in haplogroup frequencies discussed below and marked differences in mortuary behavior suggest the migration of a more socially and technologically complex population of marine foragers into the eastern Aleutians from the Alaska Peninsula at A.D. 1000, perhaps initiating a Neo-Aleut-dominated social hierarchy.

The small numbers of Alaska Peninsula burials analyzed sort both temporally and with respect to diet. Brooks River burials from the upper Naknek River drainage

are characterized by a rich riverine faunal community (Dumond 1981, 1987). Faunal assemblages are dominated by salmon (*Oncorhynchus* spp.), freshwater char (*Salvelinus* sp.), and caribou, along with beaver (*Castor canadensis*) and porcupine (*Erethizon dorsatum*), but are low in marine mammals, suggesting an inland focus on terrestrial taxa with the seasonal inclusion of pinnipeds such as harbor seal (*Phoca vitulina*), hauling out along Bristol Bay in early summer. Port Moller burials are from the Hot Springs site along the western arm of Moller Bay (Okada and Okada 1974; Workman 1966). Ecologically this area resembles the eastern Aleutians but with the addition of salmon, walrus, and caribou. Reliance on low trophic level marine taxa, such as salmon and walrus, would deplete $\delta^{15}\text{N}$ values and adding caribou to the diet would deplete both $\delta^{15}\text{N}$ and $\delta^{13}\text{C}$. Interestingly, Port Moller burials exhibit more variability in their nitrogen isotope chemistry than other groups shown in Table 2.1. Variability is partially, but not entirely, accounted for by the presence of an infant burial in the study, since nursing infants subsist a trophic level above their mothers and presumably other adults in the population. Port Moller radiocarbon dates confirm the antiquity of the site but are unlikely to represent its full temporal range. Finally, the Mink Island site lies ~2.5 km off the Katmai mainland. Deeply stratified with more than seven meters of culture deposits, National Park Service excavations report (Hilton 1998) the presence of a diverse array of fauna and note that whereas fish and invertebrates are common, antler and ivory are rare. Our data indicate diets dominated by marine foods but lower in trophic level than Sadlermiut or eastern Aleutian diets. The Mink Island burial assemblage dates late in prehistory, clearly not representative of the earliest occupation of the island, which is thought to predate our burials by several millennia.

In summary, Figure 2.1 plots collagen $\delta^{15}\text{N}$ against $\delta^{13}\text{C}$ for individual and all site mean values in Table 2.1. Two interesting relationships are evident. First, linear regression shows the typically strong correlation between stable carbon and nitrogen mean values common to high latitude marine foragers in which increases in trophic level accompany greater reliance on marine foods. This relationship is not surprising since both isotopes are enriched as trophic level increases, $\delta^{13}\text{C}$ by ca. 1‰ and $\delta^{15}\text{N}$ by ca. 3‰. Although the fit is good and clearly significant ($r^2 = 0.708$, $F = 33.943$, $df = 15$, $p < 0.001$), a second-order polynomial provides a better fit with $r^2 = 0.819$. Thus, it appears that $\delta^{15}\text{N}$ values of 20–21‰, exhibited by the Mansel Island burial, the prehistoric Sadlermiut and Dorset, as well as Kagamil and Shiprock burials, may reflect the highest trophic level at which Arctic marine foragers subsisted, independent of nursing infants. Moreover, at the top of the Arctic food web, $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ are not significantly correlated ($r^2 = 0.074$, $F = 0.318$, $df = 5$, $p = 0.603$). $\delta^{13}\text{C}$ values cover a 1.5‰ range, whereas the range of $\delta^{15}\text{N}$ values is 0.5‰. This patterning suggests that variation in $\delta^{13}\text{C}$ at the top of the food web is heavily structured by temporal and/or geographic variation in the carbon isotope chemistry of the marine ecosystem, perhaps disproportionately affecting highest trophic level migratory prey taxa such as Steller sea lions (*Eumetopias jubatus*) or fur seal (*Callorhinus ursinus*) in the Aleutians and ringed seal (Riedman 1990) and sea birds in the eastern Arctic.

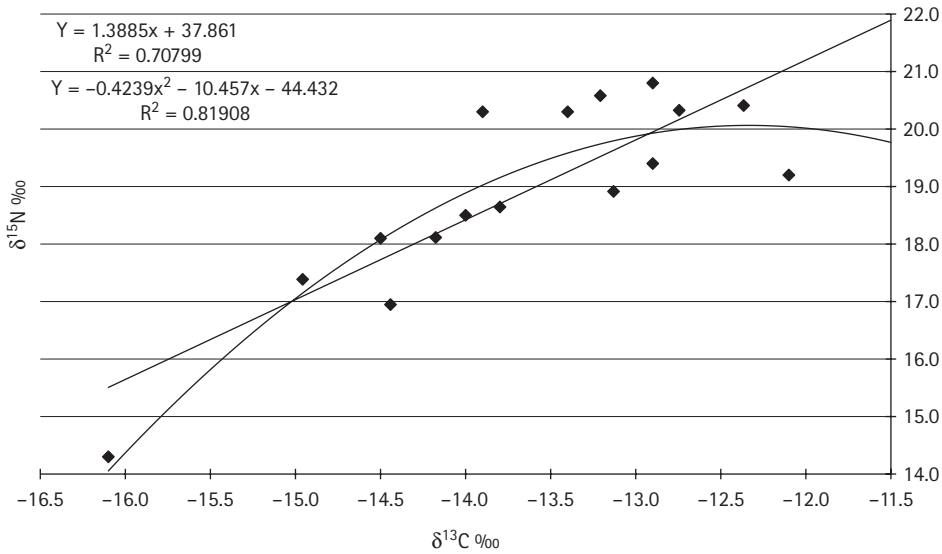


FIGURE 2.1 Individual and average $\delta^{15}\text{N}$ values are plotted against $\delta^{13}\text{C}$ (Table 2.1). Equations for both the linear and second-order polynomial regression are shown. Although the relationship between variables in both regressions is significant, the latter is a better fit given the seemingly random distribution of $\delta^{13}\text{C}$ readings associated with diets highest in the Arctic food web.

Figure by Joan Brenner Coltrain

NATIVE AMERICAN GENETICS

Founding Genetic Lineages in the Americas

The two most commonly screened genetic systems for aDNA are mitochondrial DNA (mtDNA), which traces matriline, and the nonrecombining region of the Y-chromosome (NRY), which tracks patriline. There are currently 15 known founding Native American mtDNA haplotypes—A2*, A2a, A2b, B2, C1b, C1c, Cld*, Cld1, C4c, D1, D2a, D4b1a2a1a, D4h3a, X2a, X2g (Perego et al. 2010). Of these, A2*, B2, C1b, C1c, D1, and D4h3a are pan-American haplotypes, while X2a/X2g are confined primarily to the Great Lakes area (Perego et al. 2009; Tamm et al. 2007). These haplotypes, apart from A2a, A2b, D2a, and D4b1a2a1a, all show minimum coalescence dates of 13–18 thousand years ago (kya), indicating they were likely present in the initial migration(s) into the Americas, and are all exclusive to Native Americans (see O’Rourke and Raff 2010 for a brief review of the genetic history of the Americas).

The majority of NRY genetic diversity in the Americas is contained in haplogroups C, Q, and R. These are the three major haplogroups present at frequencies greater than 5 percent in the Americas (Zegura et al. 2004). Haplogroups Q1 (Q-P36) and/or Q1a3a

(Q-M3; previously Q3) and C3b (C-P39) represent the founding Native American lineages. As Q1a3a is a daughter of Q1 (which is itself found in both Asia and the Americas), the actual number of founding Q lineages will probably increase as more data accumulate. Zegura et al. (2004) found an average coalescent age for both Q and C haplogroups of 10.1–17.2 kya, suggesting that they too played a role in the initial peopling of the Americas.

Beringian-Specific mtDNA

Beringian-specific mtDNA haplotypes A2a, A2b, D2a, and D4b1a2a1a are restricted to populations in northern North America, subsequent migrants from the North American Arctic (southern and Pacific coast Athapaskans), and native northeastern Siberian Chukotkans. They have coalescent ages much younger than those displayed by the hypothesized initial founding haplotypes, which suggests they were part of later Holocene (<10 kya) Circumarctic migrations or gene flow (Gilbert et al. 2008; Helgason et al. 2006; Perego et al. 2010; Volodko et al. 2008). The late expansion and limited dispersal of these haplotypes does not preclude the identification of older ancestral lineages traceable to eastern or central Asia. However, the northeast Asian gene pool shows marked discontinuity from the rest of Asia and even from nearby Yukaghir, Nganasan, and Kamchatkan Siberian populations, which have a wider variety of A, C, and D haplogroups of varying lineage ages (Derenko et al. 2010; Rubicz et al. 2010; Volodko et al. 2008).

Beringian NRY

Non-Native postcontact Eurasian male admixture seems to have erased most signatures of ancient Y-chromosome diversity among Beringian Chukotkans and Koryaks and Eskimo-Aleut populations (Rubicz et al. 2010). Accordingly, Siberian populations exhibit an increased diversity of NRY haplogroups (as they do mtDNA haplogroups) when compared to Native North American. Haplogroup N-M178 (or N-TatC), for example, is the most frequent single Y-chromosome haplogroup in Siberia, widespread across much of north Eurasia and particularly frequent in Chukotka and the Yakuts, though it is not found in Iñupiat populations from Alaska to Greenland (Karafet et al. 2006; Stoneking and Delfin 2010). Native American specific haplogroup Q-M3, on the other hand, is found in the Chukchis and Siberian Eskimo, probably from back-migration, and Q-P36 is found in Altaians, northwestern, and northeastern Siberia (Karafet et al. 2006; Lell et al. 2002). Native American specific haplogroup C-P39 has only been found at low frequency in the North American Arctic (east Greenland; see Zegura et al. 2004 for discussion) and never in Siberia, though C-M217, the parent haplogroup, is found in central and eastern Siberia, and C-M86, a sister haplogroup, is widely distributed in Siberia and Mongolia (Stoneking and Delfin 2010).

Unique Autosomal Genetic Signatures of Arctic North American Populations

Several large surveys of autosomal microsatellite markers, short tandem repeats (STRs), from populations across the Americas have recently appeared (Lewis 2010; Ray et al. 2010; Wang et al. 2007). They all show that Native American populations have lower genetic diversity and higher rates of genetic differentiation than other continental regions. This result is consistent with a hypothesized population bottleneck during the initial peopling of the Americas, followed by drift and reduced gene flow in small populations during expansions into the continental interiors. Wang et al. (2007) observed signals of decreasing genetic diversity and decreasing genetic similarity to Siberians as a function of distance from Beringia. Lewis (2010) also supported a pattern of serial founder effects from Asia to North America to South America. It has been suggested that signals of north-south gradients are indicative of the initial peopling event. Ray et al. (2010), however, reanalyzed the data from Wang et al. and determined that the STR data were best fit with a model of initial colonization followed by recurrent gene flow between Asia and American populations. The model further indicated gene flow was greater between populations of North America than those of South America, was bidirectional with Asia, and was, tentatively, estimated to be recent (<10 kya). The STR variation, therefore, may reflect the later Circumarctic Holocene migrations in northern North America.

Differences in ancestry between northern and southern populations in the Americas is also supported by autosomal single nucleotide polymorphism (SNP) data (Hellenthal et al. 2008; Rasmussen et al. 2010; Reich et al. 2012) and X-chromosome *dys44* haplotypes (Bourgeois et al. 2009). Hellenthal et al. (2008) suggest that while there has been substantial gene flow between North and South America, North American populations have experienced greater admixture with Siberian populations. This might explain the decreasing gradients of genetic similarities to Siberians reported by Wang et al. (2007). Rasmussen et al. (2010) combined SNPs from 51 global populations (the HGDP-CEPH panel) with four additional native North American and 12 additional north Asian populations. They observed that the Inuit of Greenland displayed a “Beringian” genetic component that was shared with Siberian Chukchis and Koryaks (and no other Siberian groups), the extinct Paleoeskimo Saqqaq (see below), and Native American Na-Dene speakers. Unlike the Saqqaq individual, however, the Greenland Inuit did show clear shared ancestry with Amerindians. A recent analysis of over 350,000 autosomal SNPs in 52 Native American and 17 Siberian populations by Reich et al. (2012) exhibits some concordant inferences with Rasmussen et al. (2010), but some distinct inferences on colonization patterns and gene flow as well. Reich et al. (2012) conclude that at least three migration streams are required to account for the genetic diversity seen in Native American populations; the first they term First American; the second is the subsequent colonization streams associated with Eskimo/Inuit/Aleut population; the third is attributed to ancestors of modern Na-Dene speakers. It is important to note that while both

the Arctic and Na-Dene migrations are seen as distinct movements of peoples, all three colonizations had initial shared ancestry, and each of the subsequent two streams experienced extensive admixture with the earlier First American migration. For example, the hypothesized Na-Dene migration shares nearly 90 percent of genetic ancestry with First Americans. The proportion of sharing with First Americans is much less in the arctic Inuit/Aleut data, however. A bit more than half of the genetic variation is attributed to shared ancestry with Na-Dene-speaking populations, and evidence exists for substantial back migration and gene flow with northeast Siberian populations (Reich et al. 2012). It should also be noted that the SNP analysis by Reich et al. included only a single Na-Dene-speaking population. Bourgeois et al. (2009) evaluated data on the X chromosome, particularly haplotypes of the *dys44* segment, and determined that a signal of Siberian admixture was evident in northern Native populations, though it was less than that seen in autosomal STR data. Intriguingly, this paper found no correlation between *dys44* haplotype frequencies in Na-Dene and Amerind speakers.

Studies on a high-frequency Native American private allele at tetranucleotide microsatellite locus D9S1120 also indicated that western Beringian populations share more recent ancestry with Native Americans than with other Asian groups. In Native American and western Beringian populations, the 9-repeat allele (9RA or “275-bp allele”) is found at an average frequency of 35.4 percent (and is never found at less than 10 percent frequency) and is absent in all other worldwide populations sampled (Schroeder et al. 2009). To determine if all 9RA alleles in the Americas were identical by descent and represented neutral markers, SNPs were typed in a 500kb region around D9S1120. A shared 76.26kb SNP haplotype (the American Modal Haplotype, AMH) was observed in 90.5 percent of the chromosomes containing 9RA, with the remaining 9RA likely originating from recombination events with AMH-associated 9RA chromosomes. The AMH is found throughout Eurasia (not associated with 9RA), most frequently in South Asia (12.6 percent). While simulations allowing substantial gene flow between the Americas and Asia typically prevented high-frequency private alleles like 9RA from evolving, the presence of minor gene flow did not (Schroeder et al. 2009).

Molecular diversity at another single locus, the ABO blood group, also has been investigated in Native American populations (Estrada-Mena et al. 2010; Villanea et al. 2013). Major alleles (A, B, O) of this locus are present in most populations worldwide, though with regional frequency distributions. The O alleles, encoding inactive enzymes, are the most abundant in human populations, observed at 61–98 percent frequencies. In the Americas, the O allele is the exclusive allele at the ABO locus in the majority of native populations. Recently haplotype O^{lv} was determined to be the most frequent in sampled Native Americans from North, Central, and South America, with lineage O^{lvG542A} specific to Native Americans. Na-Dene speakers are unique, however, in having both A and O alleles, while Eskimo-Aleut populations are characterized by the presence of all three alleles—A, B, and O (Estrada-Mena et al. 2010). The O^{lvG542A} lineage was recently identified in Tlingit and Haida (Na-Dene-speaking populations), as well as in a pre-Colombian ancient North American population (Villanea et al. 2013), supporting the shared ancestry of all Native Americans.

In summary, there appears to be a genetic signature of an initial expansion into the Americas, followed, or accompanied, by gene flow between northeastern Siberian populations and northern North American populations. (A similar conclusion was reached after a recent reanalysis of Asian and American craniofacial variation; see González-José et al. 2008.) The few existing studies of aDNA in Arctic samples provide additional insight in the prehistory of the North American Arctic.

USES OF DIRECTLY DATED, GEOGRAPHICALLY PROVENIENCED aDNA

The value of accessing genetic material from an ancient sample is maximized when the geographic location and the age of the sample are precisely known. If the remains are found within an archaeological context, the genetic information may be linked to a cultural tradition, providing further information on population-level events. Ancient genetic samples from multiple individuals from a restricted geographic area can provide evidence of genetic change over time and/or the scale of genetic diversity within a continuous population. aDNA from even a small number of individuals can demonstrate the existence of specific genetic lineages at set points in time and perhaps indicate the presence of genetic lineages in the past that no longer exist in modern populations.

Most aDNA studies on Native American prehistory have been based on fairly recent (<5 kya) samples. Although much of the genetic information that we have postdates the initial colonization of the Americas, it does speak directly to the Holocene colonization of the North American Arctic.

Eurasian Origins

Studies of modern Native American genetic variation indicate the founding populations of the Americas experienced a period of geographic isolation and temporal “pause” in Beringia prior to the last glacial maximum (LGM) (Bonatto and Salzano 1997; Hoffecker et al. 2014; Mulligan et al. 2008; Szathmary 1993; Tamm et al. 2007). The population substructure, size, and subsequent expansion of these groups have been discussed elsewhere (Fagundes et al. 2008; Mulligan et al. 2008; Rubicz and Crawford, this volume, chapter 1; Schroeder et al. 2009; Tamm et al. 2007), though archaeological sites and human remains in Siberia or Alaska during this time are lacking (see individual MA-1 from Mal’ta below). We know humans inhabited the Siberian Arctic at least by 32 kya (e.g., the Yana Rhinoceros Horn site: Pitulko et al. 2004), but there is a subsequent dearth of evidence until Swan Point in central Alaska, reliably dated to 14 kya (Goebel et al. 2008). The Ob, Yenisei, Lena, and Amur rivers may all have served as routes into Beringia from the south, and populations along these river systems may yet

contain American founding lineages (Starikovskaya et al. 2005). Human remains and artifacts are also relatively scarce in these areas from 40–20 kya, meaning little is currently known about the spatial distribution and genetic or cultural variability of these Asian populations (Goebel et al. 2008; González-José 2008). If Native American founding populations were isolated prior to the formation of the modern distribution of Asian populations, various genetic loci might indicate geographically widely separated peoples as ancestors (Schroeder et al. 2009).

The role an early resident population in Arctic Beringia played in the genetic profile of ancient and modern Arctic populations remains unclear. Recently, Raghavan et al. (2014b) reported a draft genome sequence of a 24,000-year-old child (MA-1) from the Mal'ta site in south-central Siberia. Given its antiquity, it may speak more to how we view the origin of initial migrations to the Western Hemisphere than to our understanding of the history of North American Arctic populations. Nevertheless, it is relevant for several reasons. The mitochondrial lineage of this individual was found to belong to haplogroup U, a group of lineages so far not observed in the Americas, while its Y-chromosome lineage is a basal lineage to Y-haplogroup R, a sister group to the most common Native American Y-lineage, Q. Analysis of the nuclear sequence data from this individual indicated stretches that were clearly ancestral to West Eurasian populations, but others that were distinctly Native American in origin. The authors infer that this is evidence for admixture between Eurasian and early Native American source populations prior to population movement eastward post-LGM and the subsequent colonization of the Americas. However, the geographic signal in such data is equivocal, and the data from this single genome are consistent with a view that the admixture occurred further east, and the population to which the Mal'ta child belonged was part of a westward movement as northern latitudes were being abandoned at the onset of the LGM.

For our purposes, the real import of the Mal'ta genome at 24 kya is that it is evidence that a distinctive Native American genome was identifiable by this time. This implies that the isolation required to differentiate a distinctive Native American genome from its Asian ancestral gene pool had already been accomplished by this early date. Absent any genetic, archaeological, or paleoenvironmental data that indicates where in Siberia such an isolation could have occurred prior to 25 kya, Beringia remains a plausible geographic location for isolation and origin of the Native American gene pool prior to colonization of the Western Hemisphere. Indeed, recent paleoecological data indicating refugia in southern Beringia during the LGM provide evidence for the possibility of human occupation throughout the LGM that is concordant with genetic analyses and models of colonization (e.g., Hoffecker et al. 2014).

Direct evidence from aDNA in northern North America is sparse prior to the Holocene. The sole ancient northern sample predating the mid-Holocene that has yielded aDNA is the 10.3 kya skeletal specimen on Prince of Wales Island, Alaska, from the On-Your-Knees Cave site. Kemp et al. (2007) analyzed mtDNA and NRY from this sample and discovered that it carried the mtDNA control region motif for haplotype D4h3a and the length polymorphisms on the NRY for Q-M3. In comparing the sample to 3,286 Native American sequences across North and South America, they found

mtDNA haplotype D4h3a in ~1.4 percent of the samples. They also found one occurrence of the haplotype in an eastern Chinese individual (later delineated by its own branch, D4h3b). The study by Kemp et al., with the relatively old age and unique geographic location of the specimen, not only placed minimum ages for the emergence of haplogroups D4h3a and Q-M3, but instigated greater discussion over the routes from Beringia into the Americas for the initial peopling event (coastal versus interior).

Later Arctic Migrations

As already noted, there is genetic evidence of bidirectional gene flow between northeast Asia and North America. This admixture is posited to have begun at some point in the Holocene. Any residual populations of Beringia could have acted as a “genetic cross-roads” between more recent Asian derived lineages and Native American derived lineages. The Holocene potentially brought new and unique Asian genetic lineages to the North American Arctic. Concurrently, certain genetic lineages in the Americas could have back migrated into Siberia (Reich et al. 2012; Rubicz et al. 2010). Only securely dated aDNA samples will ultimately provide access to and context for the hypothesized gene flow among Circumarctic populations, and resolve the timing of these demographic events.

aDNA and Aleutian Prehistory

It is generally accepted that the Aleutian Islands were colonized westward from mainland Alaska sometime before 8.7 kya (Hrdlička 1945; McCartney 1984). Despite cultural (McCartney 1984) and dental (Turner 1991) continuity of the prehistoric burials over time, Hrdlička (1945) suggested that a second colonization event took place in approximately A.D. 1000 by the ancestors of modern Aleuts, who replaced the (cranially distinct) “Pre-Aleut” population. Molecular characterization of prehistoric Aleutians with an eye toward testing Hrdlička’s population-replacement hypothesis was undertaken by Hayes (2002) and Smith et al. (2009). Both studies used mtDNA discrete marker analysis (restriction fragment length polymorphisms [RFLPs] and a length polymorphism) to compare haplogroup frequencies of the groups Hrdlička identified as Pre-Aleut (now known as “Paleo-Aleut”) and “Neo-Aleut.”

Hayes 2002 successfully typed 30 individuals: 16 Paleo-Aleuts and 12 Neo-Aleuts (and two of unknown affiliation). Smith et al. (2009) typed an additional 39 individuals; 22 Paleo-Aleuts and 12 Neo-Aleuts (and five of unknown affiliation). As expected, only haplogroups A and D were found in these samples. The addition of data by Smith et al. (2009) significantly altered the haplogroup frequencies reported earlier by Hayes (2002), reiterating the importance of large sample sizes when relying on frequency data for the reconstruction of population histories. In combination, the data from Hayes (2002) and Smith et al. (2009) indicate that there was no statistically significant genetic difference between Hrdlička’s two prehistoric “populations.” However, a difference in

haplogroup frequencies was observed in comparing populations diachronically; prehistoric Aleutians prior to A.D. 1000 (Hrdlička's proposed date of migration) were characterized by 72 percent haplogroup A and 28 percent haplogroup D. Individuals from after A.D. 1000 were 23 percent A and 77 percent D.

Raff et al. (2010) published the results of a pilot study aimed at identifying potential source populations for a movement of peoples into the archipelago after A.D. 1000. In this case, the authors took a higher-resolution approach by sequencing the mitochondrial HVSI to identify individual haplotypes. Samples were taken from the Hot Springs site near Port Moller, Alaska (~A.D. 2000), from sites in the Brooks River area on the Alaska Peninsula (A.D. 900–1300), and from Mink Island (A.D. 1000–1200). The authors found haplotypes A2 and D2, typical of Aleut populations, but also haplotypes unexpected for this region, including D3 (now termed D4b1a2a1a; Mink Island), D1 or C1 (Brooks River), and the (thus far) northernmost occurrence of haplogroup B2 in an ancient population (Brooks River).

Paleoeskimo and Neoeskimo Origins

Early aDNA studies used RFLP analysis of Dorset, Thule, and the Sadlermiut (see Table 2.2) to determine that the Thule populations were essentially monomorphic for haplogroup A and the Dorset appeared monomorphic for D. The Sadlermiut had approximately equal frequencies of A and D (Hayes 2002). These studies suggested that the Thule are the only direct genetic ancestors of modern North American Arctic peoples, with the potential for some localized admixture events between early Thule and Paleoeskimos (Dorset) accounting for the minor frequency of D haplotypes in the modern eastern Arctic (Hayes 2002; Helgason et al. 2006). To investigate this further, two recent large-scale mtDNA surveys of Arctic populations were completed. The first sequenced mtDNA from ancient human remains across Arctic Siberia, Alaska, Canada, and Greenland (Raghavan et al. 2014a), and the second sequenced the same in modern communities of the Alaskan North Slope (Raff et al. 2015).

The report by Raghavan et al. (2014a) confirmed PCR (Polymerase Chain Reaction)-based mtDNA haplogroup assignments for 112 ancient samples from Siberia, Alaska, Canada, and Greenland. In addition, low-coverage whole genomes were obtained for 26 of the ancient samples. The samples span Paleoeskimo individuals from the eastern Canadian Arctic (Pre- and Middle Dorset) and Greenland (Saqqaq), Thule from eastern Canada, and five Siberian Birnirk individuals. Almost all of the Paleoeskimo samples sequenced by Raghavan et al. (2014a) belonged to mtDNA lineage D2a, a haplotype found in modern Aleuts, Siberian Sireniki Yuits, and American Na-Dene, but not found in modern Neoeskimo. The sole exception was a single Pre-Dorset individual from Rocky Point, which proved to have mtDNA lineage D4e. This mitochondrial lineage is immediately ancestral to D2a, and the inability to resolve its phylogenetic position further may be the result of the low-coverage NGS (Next Generation Sequencing) genomic

Table 2.2 Arctic and Subarctic Human aDNA Samples from Populations Discussed

Location	Population	Approximate Dates* (ybp)	N	Reference(s)
On-Your-Knees Cave, Alaska	—	10300	1	Kemp et al. 2007
Chaluka, Umnak Island, Alaska	early Aleuts	1170–3435	11	Smith et al. 2009
Umnak Island, Ship Rock Island, and Kagamil Island, Alaska	late Pre-Contact Aleuts	386–916	52	Smith et al. 2009
Hot Springs Site, Port Moller, Alaska	prehistoric Alaska Peninsula	~2070	3	Raff et al. 2010
Naknek/Brooks River area, Alaska	prehistoric Alaska Peninsula	938–1318	8	Raff et al. 2010
Mink Island, Alaska	prehistoric Prince William Sound	1029–1215	6	Raff et al. 2010
Mansel Is. and Southampton Is., E. Canada	Dorset	1216–2260	2	Hayes et al. 2002
Kamarvik and Silumiut, NW Hudson Bay, E. Canada	Thule	628–1130	17	Hayes et al. 2002
Native Point, Southampton Is., E. Canada	Sadlermiut	682–977	18	Hayes et al. 2002
Qeqertasussuk, Greenland	Paleoeskimo Saqqaq	3600–4170	1	Rasmussen et al. 2010
Central Yakutia, Russia	Yakuts	50–550	~68	Ricaut et al. 2006, Fedorova et al. 2008, Crubézy et al. 2010
Krasnoyarsk Krai, Russia	Kurgan	1550–3750	26	Keyser et al. 2009
Kurtuguz I and Sopinsky sites, Ural, Russia	Sargat	1450–2450	7	Bennett and Kaestle 2010
Lokomotiv and Ust'-Ida cemeteries, Cis-Baikal, Russia	Neolithic Siberians	3970–8075	70	Mooder et al. 2006
Lower Kolyma River basin, northeastern Yakutia, Russia	Neolithic Siberians	3600	1	Ricaut et al. 2005

(continued)

Table 2.2 Continued

Location	Population	Approximate Dates* (ybp)	N	Reference(s)
Kerdugen site, central Yakutia, Russia	Neolithic Siberians	2950–3950	2	Fedorova et al. 2008
Mal'ta site, Pre-Baikal, Russia	Paleolithic Siberians	24,000	1	Raghavan et al 2014a
Afontova Gora-2 site, Krasnoiarsk Krai, Russia	Paleolithic Siberians	17,000	1	Raghavan et al 2014a
Rocky Point site, Canada	Pre-Dorset	4092–3755	1	Raghavan et al. 2014b
Qeqertasussuk, Greenland	Paleoeskimo Saqqaq	5290–3872	5	Raghavan et al. 2014b
Itinnera site, Greenland	Paleoeskimo Saqqaq	3838–3515	1	Raghavan et al. 2014b
Buchanan site, Canada	Middle Dorset	2123–1448	1	Raghavan et al. 2014b
Alarnerk site, Canada	Middle Dorset	1276–1048	1	Raghavan et al. 2014b
Tayara site, Canada	Middle Dorset	1742–1448	1	Raghavan et al. 2014b
Gargamelle Cave, Canada	Middle Dorset	1638–1360	10	Raghavan et al. 2014b
Eastern Point site, Canada	Middle Dorset	1520–1329	1	Raghavan et al. 2014b
Philip's Garden site, Canada	Middle Dorset	1524–1322	1	Raghavan et al. 2014b
Englee site, Canada	Middle Dorset	1637–1385	1	Raghavan et al. 2014b
Saatut site, Canada	Middle Dorset	1372–1275	1	Raghavan et al. 2014b
Cape Grinnell site, Greenland	Late Dorset	NR	1	Raghavan et al. 2014b
Angekok site, Canada	Late Dorset	899–650	1	Raghavan et al. 2014b
Hopedale site, Canada	Thule	340–126	1	Raghavan et al. 2014b

Labrador site, Canada	Thule	425–191	2	Raghavan et al. 2014b
Port Hope, Ailek, Canada	Thule	428–48	3	Raghavan et al. 2014b
Silumiut, Canada	Thule	738–69	9	Raghavan et al. 2014b
Kamarvik, Canada	Thule	673–300	11	Raghavan et al. 2014b
Sadlermiut, Canada	Thule	497–58	10	Raghavan et al. 2014b
Imaha, Canada	Thule	536–417	1	Raghavan et al. 2014b
Kap Sankt Jacques, Greenland	Thule	740 ± 70 (uncalib)	1	Raghavan et al. 2014b
Dødemandsbugten, Greenland	Thule	NR	4	Raghavan et al. 2014b
Suess Land, Greenland	Thule	NR	3	Raghavan et al. 2014b
Cape Irminger, Greenland	Thule	NR	1	Raghavan et al. 2014b
Skærgaardshalvø, Greenland	Thule	NR	2	Raghavan et al. 2014b
Ruinnæsset, Greenland	Thule	NR	2	Raghavan et al. 2014b
Imertiit, Greenland	Thule	NR	3	Raghavan et al. 2014b
Qilakitsoq, Greenland	Thule	NR	8	Raghavan et al. 2014b
Assumiut, Greenland	Thule	NR	1	Raghavan et al. 2014b
Inuarfissuaq, Greenland	Thule	NR	4	Raghavan et al. 2014b
Nunalleq, Alaska	Thule	NR	33	Raghavan et al. 2014b
Reindeer Point, Greenland	Late Dorset–Thule?	NR	3	Raghavan et al. 2014b
Nash Harbor, Alaska	Norton	NR	1	Raghavan et al. 2014b
Paipelghak, Siberia	Birnirk	1378–1276	5	Raghavan et al. 2014b

*Source:*Table adapted from Raff et al. (2011:Table 1) and Raghavan et al. (2014a:Table S1).* As reported by original authors; converted to ybp when necessary.

data that were obtained. Archaeologically recovered Thule individuals from both Canada and Greenland shared mtDNA lineages with modern Inuit populations (i.e., A2a, A2b, and D4b1a2a1a), and collectively they form a single clade distinct from Siberian and Paleoeskimo samples.

Raghavan et al. (2014a) also characterized Siberian Birnirk and Canadian Sadlermiut remains. The Birnirk samples were all typed as mtDNA lineage A2a. As this lineage is yet unobserved in any Paleoeskimo examined, the Siberian Birnirk individuals provide a long-distance link, and perhaps a likely ancestry, for Thule origins west of the Bering Strait. The Sadlermiut individuals, historically hypothesized to represent a hybrid population between Thule and Dorset, proved to carry mtDNA lineage D4b1a2a1a. Since the mitochondrial D lineage present among the Sadlermiut is typical of Thule and modern Inuit, and not the D2a lineage that has characterized all Paleoeskimos studied to date, this hypothesis is no longer consistent.

As the archaeological record supports an eastward migration from Beringia for the Thule, Raff et al. (2015) surveyed eight Alaskan North Slope communities using sequence data from the mitochondrial D-loop. They found the expected Arctic haplotypes A2a/A2b/D4b1a2a1a, supporting this location as a likely origin point for Inuit, Inupiat, and Eskimo peoples. However, additional haplotypes were also sequenced: haplotype D2a, and C4c, a modern pan-American haplotype. The higher-than-expected genetic diversity in the North Slope suggests it as an ancestral Arctic source population, and the presence of D2a might show a degree of continuity with earlier Paleoeskimo migrations. Overall, the results of Raghavan et al. (2014a) and Raff et al. (2015) are concordant with the archaeological record in recognizing the Thule as ancestors of modern Inuit.

A more detailed analysis of a single Paleoeskimo individual was provided by whole-genome sequencing of 4170–3600 cal B.P. remains from western Greenland, culturally affiliated with the Independence I-Saqqaq archaeological traditions. Gilbert et al. (2008) and Rasmussen et al. (2010) successfully sequenced the mitochondrial and nuclear genomes, respectively, of this individual. In doing so, they revealed not only the genetic signature of a Paleoeskimo, but the first ancient genome of an anatomically modern human. These investigators determined that the Saqqaq individual carried mtDNA haplotype D2a. The individual also carried NRY haplogroup Q1a. This placed him within the major Native American haplogroup Q1 branch, though lacking the private mutation at M3. Autosomal SNP analysis consistently grouped the Saqqaq individual with the Chukchis and Koryaks of Chukotka and northern Kamchatka, respectively, and showed a more distant relationship to any New World indigenous populations, though it did share a “Beringian” component with Greenland Inuit. The Saqqaq genome did not exhibit signs of west Eurasian admixture, indicating that modern contamination in the sample was low and supporting the belief that Eurasian gene flow in Arctic populations was a recent historical event. The coalescence of the mtDNA D2a1 clade was estimated at 7500 ± 4500 B.P., based on a full coding region mtDNA mutational clock. The dates for the coalescence of the A2a and A2b clades were bracketed by more recent time ranges,

as expected if these haplotypes were carried across the Arctic by the Thule migrations around A.D. 1000 (Gilbert et al. 2008).

The close relationships between a Paleoeskimo from western Greenland and modern northeastern Siberian populations suggest a discontinuity both with the Eskimo-Aleut and with native groups of southern North America and South America. The Saqqaq individual shares common ancestry via the northeastern Siberian populations with modern-day Eskimo-Aleut, without discernable admixture with American Indians. However, the Saqqaq does carry a lineage of one of the NRY haplogroups found in the majority of Native Americans and an mtDNA haplotype currently found among Na-Dene groups and Unangax (Aleuts). The Saqqaq individual's relationship with Na-Dene speaking populations is still under investigation, given conflicting analyses (Raghavan et al. 2014b; Reich et al. 2012), likely due to the limited number of Na-Dene genomes sequenced at this time. In summation, it can be hypothesized that the Paleoeskimo did originate from a Beringian source population, though one which was genetically different from both earlier American Indian and later Arctic migrations.

Siberian aDNA

Ancient DNA evidence from Siberia has the potential to provide genetic signatures of the demographic events—migrations, isolation and drift, Russian contact—that occurred during the last glaciation and subsequent Holocene. Other than the late Pleistocene dated Mal'ta genome discussed above, there is a notable absence of human aDNA evidence from the Siberian Arctic. Nevertheless, documenting genetic or genomic diversity of ancient Siberian populations from Subarctic regions offers an opportunity to provide information on the source populations for the initial colonization of the Americas and subsequent Holocene gene flow within or between Asia and the Americas.

The vast majority of Siberian human remains from which aDNA has been studied derive from south-central Siberia and have been archaeologically, but not directly, dated. Ancient individuals representing the Yakuts, a group culturally and linguistically distinct from any of their Siberian neighbors, have been analyzed. These samples dated from the fifteenth to the twentieth centuries and were found in central Yakutia (Sakha Republic). Results from autosomal STRs, Y-chromosomal STRs/SNPs, and mtDNA suggested a possible source population for the Yakuts in the Cis-Baikal region, with later female mediated gene flow from south Siberia, particularly from Evenk women (Crubézy et al. 2010; Fedorova et al. 2008). In the Krasnoyarsk Krai, to the west of Yakutia, ancient genetics of the Kurgan people have also been analyzed, from samples dated between the middle of the second millennium B.C. to the fourth century A.D. Thought to represent the eastward migration of early Indo-Europeans, autosomal STRs, Y-chromosomal STRs/SNPs, and mtDNA genetic markers indicated that burials

associated with this culture carried a western Eurasian NRY haplogroup (R1a1) and predominately western Eurasian mtDNA in the Bronze Age, though an increasingly East Eurasian mtDNA signature in the Iron age (Keyser et al. 2009). In southwestern Siberia, near the Urals and the present-day Kazakhstan border, ancient mtDNA was amplified from remains at two burial sites representing the Sargat culture and dating between the fifth century B.C. and the fifth century A.D. The mtDNA haplogroups sequenced support the archaeological inference that the Sargat culture was a zone of genetic and cultural exchange between native Ugrian and/or Siberian groups and the southern steppe cultures (Bennett and Kaestle 2010).

A few older, Neolithic human samples have also had aDNA successfully extracted. In one study, two Cis-Baikal cemetery populations had HVSI and coding-region RFLP data collected. One cemetery, Lokomotiv, had calibrated radiocarbon dates of 6125–4885 B.C. and high frequencies of haplogroups D and F, while the other cemetery, Ust'-Ida, had calibrated radiocarbon dates of 3710–2020 B.C., and high frequencies of haplogroups A and C. No mtDNA haplogroups B or X were discovered, though G2a and U5a were also present. From these results the authors interpreted a genetic discontinuity in the area around the sixth millennium B.P., with the older population genetically closer to modern groups in the Yenisey and Ob River basins and the younger population genetically similar to modern neighboring Siberian groups (Mooder et al. 2006). Two sites in Yakutia provided additional samples. Ricaut et al. (2005) extracted DNA and analyzed autosomal STRs and the HVSI of mtDNA from a tomb (radiocarbon dated at 3600 ± 60 B.P. from associated bone artifacts) of a frozen 20–25-year-old female near the lower Kolyma River basin of northeastern Yakutia. The mtDNA sequence could be refined only to haplogroup C. The STR data clustered the sample closer to Arctic North American populations and East Asians than to other Native Americans or Europeans. Fedorova et al. (2008), in addition to the younger Yakut samples described earlier, analyzed two skeletons from a late Neolithic grave in central Yakutia (dated 2000–1000 B.C.). These samples yielded mtDNA haplogroups A4 and G2a/D, most often found in modern Yakut, Evenk, Chinese, and south and west Siberian populations, and not found in groups from the Kamchatka or Chukchi Peninsulas.

Faunal and Ecological aDNA Studies

Mega-faunal extinctions and the changes in genetic diversity of extant large mammals in the Arctic are potential indicators of the effects of expanding human populations and shifting climate in northern latitudes. Using aDNA to investigate population loss or replacement in archaeofaunal samples allows exact correlations to be made between genetic diversity and changes in the fossil record. Such studies have, for example, challenged theories of human causation for the extinction events of horses and mammoths (Haile et al. 2009) or the diminished population sizes of the steppe bison (Shapiro et al.

2004) and muskox (Campos et al. 2010). The influence of climate warming events in post-LGM ecosystems of the Arctic on collared lemming (Prost et al. 2010) and the gray wolf (Pilot et al. 2010) have also been investigated. A recent synthesis of aDNA, ^{14}C dating, and isotopic data derived from North American elk excavated in northeast Siberia used the remains as a proxy to evaluate human movement into the Western Hemisphere at the end of the LGM (Meiri et al. 2013). These studies provide data not only on the shifting biodiversity in the Americas during initial colonization, but also during later Arctic population expansions.

CONCLUSIONS

The power to identify past demographic events relies on the knowledge of genetic and isotopic signatures of demographic transitions and on procuring securely dated biological samples with clear provenience. The relative scarcity of late Pleistocene and early Holocene human remains in the Arctic is perhaps partially offset by the expectation of enhanced molecular preservation of samples in the cold, dry environment. Studies of later Arctic Holocene events (< 1000 B.P.) have fared much better in this regard, as population-sized aDNA and isotope samples have been found and analyzed (Raff et al. 2011). It is clear, however, that single-sample investigations will remain informative and needed as the temporal window under study moves deeper in time, when fewer samples are expected to survive for recovery and study. Reconstructions of population history are strengthened by pooling aDNA, stable isotope, and radiometric data. Expanding our understanding beyond human samples to ancient faunal and ecological data (Hoffecker et al. 2014) will also provide a richer framework for testing hypotheses of human settlement and dispersal in the Arctic.

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CHAPTER 3

ZOOARCHAEOLOGY AND THE RECONSTRUCTION OF ANCIENT HUMAN- ANIMAL RELATIONSHIPS IN THE ARCTIC

MATTHEW W. BETTS

INTRODUCTION

EVIDENCE documenting the ancient relationship between humans and animals is more prevalent in Arctic archaeological sites than virtually any other region of North America. Low mean temperatures, the presence of permafrost within centimeters of the surface, low acidity soils, and a lack of vegetation with destructive root systems produce faunal assemblages which are exceptionally well preserved and generally more abundant in comparison to sites located at lower latitudes. Moreover, because of an extreme dietary focus on animal products, high-latitude faunal samples provide an unusually complete window into ancient hunter-gatherer subsistence. Thus divested of many of the taphonomic and behavioral biases that plague faunal assemblages, Arctic archaeofaunas assemblages provide a (comparatively) direct proxy for ancient economies and environments. Consequently, zooarchaeology has formed a primary component of archaeological research in the region, beginning with some of the earliest professional archaeological investigations in the North (e.g., Mathiassen 1927).

This chapter provides a review of what more than 90 years of archaeofaunal research has revealed about human-animal relationships in the Arctic and Aleutian Subarctic. The following summary is largely ahistorical and ageographical, focusing instead on the evidence for the procurement, butchery, storage, and consumption of specific northern vertebrate and molluscan taxa. Additionally, related paleoecological research,

methodological advancements, and studies which address the social and ideational correlates of animal exploitation and consumption are reviewed.

In light of recent exhaustive reviews by Darwent (2011), and the content of many of the chapters in this volume, this chapter does not attempt to provide a thorough account of the shifting subsistence proclivities of major chronocultural groups, nor does it provide a region-by-region summary of evidence for evolving subsistence strategies. Instead, the focus is primarily on the evidence for focal procurement and consumption of specific Arctic taxa (e.g., whales, seals, fish, birds, etc.). Nevertheless, within this structure, an attempt is made to provide a comprehensive account; each section generally proceeds chronologically and attempts to cover all regions and cultural groups.

A (BRIEF) HISTORY OF ZOOARCHAEOLOGICAL RESEARCH IN THE ARCTIC

Mathiassen's (1927) monograph on the excavations at the Naujan site was the first Arctic study to include an analysis and description of collected faunal remains. This early work, while unsystematic, set a standard for the next 40 years, and many pioneering reports devoted at least some attention to faunal materials. These analyses were often conducted in the field by nonspecialists (e.g., Collins 1956a), sometimes involving Inuit assistants who were familiar with animal remains (e.g., Taylor 1968:77), while other materials were sometimes returned for later analysis (e.g., Collins 1956b; Giddings and Anderson 1986). The coarse recovery and excavation techniques and/or field analysis employed at the time were often necessary in light of logistical constraints, and were consistent with techniques used elsewhere. Because these deposits were not screened, the recovered assemblages often left the impression that bird and fish bones were found in only trace amounts, even in sites where we now know that such taxa predominate (e.g., compare Balkwill and Rick 1994 with McGhee 1974; Staab 1979 with Mathiassen 1927). Despite this, it appears that these pioneering attempts may have adequately summarized the relative frequencies of mammal remains in many locations (compare Balkwill and Rick 1994 with McGhee 1974; Desrosiers 2009 with Taylor 1968; Mathiassen 1927 with Staab 1979).

By the late 1960s, support from newly established logistical centers led to extended field seasons, which permitted fine-grained excavations, and the ability to collect large faunal assemblages. Archaeologists were now able to conduct detailed faunal studies from the comfort of their reference laboratories, although field analyses with the assistance of Inuit experts continued in some areas (e.g., Arundale 1976; Schledermann 1975). Studies from this period include the first detailed descriptions of element frequencies, age profiles, and relative contribution to diet (Cox and Spiess 1980; Knuth 1967; Spiess 1978; Staab 1979; Stanford 1976). At the same time, ethnoarchaeological research

that would revolutionize the zooarchaeological discipline was conducted among the Nunamiut in the Brooks Range of Alaska (e.g., Binford 1978).

Building on these pioneering analyses, the last 30 years have seen a burgeoning of detailed archaeofaunal research in Arctic North America. Significant advancements have been made in collection procedures, especially the use of fine-mesh screen, which have led to large and relatively unbiased samples. So abundant are the faunal materials returning from the field that recent changes in Nunavut territorial heritage legislation now require analysis of a representative sample (typically 10 percent) of the recovered faunal remains. This requirement has only reinforced the tradition of archaeofaunal analysis in the region.

Despite the limited subset of researchers actively working in the Arctic, the vast quantities of excellently preserved faunal material, as well as recent heritage laws, have led to an arguably disproportionate number of archaeofaunal specialists. These specialists have increasingly attempted complex reconstructions of diets, hunting strategies, evolving economies, and paleoenvironments that are difficult, if not impossible, in lower latitudes. Much of this recent work forms the focus of the sections that follow.

PROCUREMENT AND CONSUMPTION STRATEGIES

The following sections document the zooarchaeological evidence for intensive exploitation of a *selected* range of Arctic taxa. Here the emphasis is on those taxa which formed significant portions of faunal assemblages, as measured by the number of identified specimens (NISP) or the minimum number of individuals (MNI). Such intensively procured species might be considered keystone economic taxa for Arctic hunter-gatherers—the intensive exploitation of which often meant entering into a culture-defining relationship. In general, the reviews that follow begin by discussing the evidence for procurement of each taxon (intensity of hunting and the strategies employed), followed by a discussion of any evidence for consumption of those taxa (butchery, storage, transport, or ingestion) derived from their remains. Discussion generally proceeds chronologically, from the earliest to latest cultural groups, and geographically from west to east.

Fish (*Actinopterygii*)

A suite of taphonomic factors has obscured the importance of fish in the diet of Arctic hunter-gatherers. Acidic soils in Subarctic environments can greatly affect the frequency of fish remains, which are more susceptible to chemical and manual diagenesis than other taxa (Whitridge 2001). In many areas of the Arctic, carnivore attrition has also had a significant impact on fish remains (Friesen and Betts 2006; Whitridge 2001).

Where large quantities of fish remains have been encountered, the emphasis appears to have been on the exploitation of large seasonal aggregations (runs or spawning locations), particularly those associated with fish in the families *Gadidae* and *Salmonidae*.

Fish are present in some of the earliest zooarchaeological assemblages in the Arctic, but never in abundant frequencies. At Broken Mammoth, in the eastern interior of Alaska, several salmonid or cycloid remains were recovered, indicating exploitation from the earliest occupations of the site, dating from 11,800 to 11,000 B.P. (Yesner 2001:315). Along the Lower Alaska Peninsula and the Aleutian Islands, Pacific cod (*Gadus morhua*) remains are abundant in Aleut middens from at least 4500 B.P. (e.g., Crockford et al. 2004; Desautels et al. 1971; Maschner et al. 2008). Salmonids are well represented in later Arctic and Subarctic contexts in Alaska where preservation permits. For example, salmon were likely a critical contributor to diet on the Lower Alaskan Peninsula and the Eastern Aleutians, but many sites located close to salmon streams have poor faunal preservation (e.g., Maschner et al. 2008, 2009; Maschner and Jordan 2008). Hoffman et al. (2000) have documented intensive salmon processing and storage at Peterson Lagoon from sites dating from the last millennium. Element patterning indicates that fish cranial elements were common at stream-side fishing camps, while fin elements and vertebrae were common at large village sites, leading Hoffman et al. (2000:708) to suggest that salmon was processed at summer camps and stored at larger village centers for winter consumption.

Further north, burbot (*Lota lota*), the only freshwater gadoid, was a significant focus of Neoeskimo procurement activities in the Mackenzie River Delta (e.g., Balkwill and Rick 1994; Morrison 2000). Artifactual evidence indicates that burbot were both jigged and netted under ice during their winter spawning period (Balkwill and Rick 1994; Morrison 2000). Whitefish (*Coregonus* sp.) and Pacific herring (*Clupea pallasii*) were sometimes jigged using tiny specialized lures, but more often netted (e.g., Morrison 2000). At the warm season Gutchiak site, Pacific herring (*Clupea pallasii*) accounted for more than 66 percent (NISP) of all identified animal remains. Skeletal element frequencies at this site are clearly spatially patterned, suggesting that carcasses were filleted and smoked for later winter consumption (Morrison 2000:37). Artifact analysis suggests the herring and whitefish were taken with small-gauge nets (ca. 30 mm), while large fish such as burbot and salmonids were jigged (Morrison 2000:24). So productive was this fishery that it supported winter settlement in the Eskimo Lakes area, and likely played a key role in the economic intensification and population expansion that occurred in the region ca. A.D. 1400 (Betts 2005; Friesen and Betts 2006).

In the Eastern Arctic, evidence for intensive fishing is more limited than in the productive coastlines and rivers of the west. Palaeoeskimo sites often contain few fish remains, but arctic char (*Salvelinus alpinus*) have been identified in some Early Paleoeskimo sites in the High Arctic (Darwent 2001, 2003; Meldgaard 2004:112), and well-preserved Saqqaq faunal assemblages from Greenland often contain significant amounts of Atlantic cod (*Gadus morhua*) bones (Gotfredsen and Møbjerg 2004:96; Meldgaard 2004:112). Howse (2008; see also Friesen 2009) has recently described an intensive late summer or early fall arctic char fishery on the Ekalluk River during Late

Dorset times, with more than 58 percent (NISP) of the faunal assemblages consisting of fish remains. Given the lack of jigging and netting technology in Dorset groups, these fish were likely taken with spears or harpoons (e.g., Maxwell 1985:222).

In a comprehensive analysis of Neoeskimo contexts in the Eastern Arctic, Whitridge (2001) demonstrated that while fishing-related artifacts are common in many sites, fish remains are generally limited, even at sites with low attrition. However, recent research suggests that where large runs occurred, “latent” fishing technology could be rallied to intensively exploit char, promoting it to a focal resource. On the southern coast of Victoria Island, Neoeskimo populations intensively exploited arctic char in the summer, storing fish in specially constructed caches for winter consumption (Norman and Friesen 2010). These stores were augmented by fresh fish caught through lake ice in the winter, permitting settlement in a region where winter sealing was not possible (Norman and Friesen 2010).

Birds (*Aves*)

Seasonal exploitation of migratory birds was a significant activity at many Arctic and Subarctic locations, and bird remains are often abundant at sites located near modern staging, nesting, and molting areas. Tundra swan (*Cygnus columbianus*) are the most abundant taxon (56 percent NISP) in the early Paleoarctic strata (Cultural Zone 4) at the Broken Mammoth site, and referring to modern tundra swan behavior, Yesner (2001) proposes that these deposits accumulated in the spring. In the Aleutian Islands, birds are abundant in shell middens from at least 3500 B.P. (Causey et al. 2005; Yesner 1976) and were so intensively exploited that some resident populations were locally depleted (Causey et al. 2005:259).

Pre-Dorset assemblages in the Low and High Arctic contain abundant migratory bird bone (Darwent 2011; Milne and Donnelly 2004), and in some instances in higher proportions than any other taxon (McGhee 1979:61; Milne and Donnelly 2004). Saqqaq Phase sites in Greenland contain very high proportions of migratory ducks, geese, and alcids (Gotfredsen and Møbjerg 2004:143; Meldgaard 2004:112). At the Choris-/Norton-related Lagoon site on Banks Island, snow geese (*Chen caerulescens*) (37.4 percent NISP) and ptarmigan (*Lagopus* sp.) (22.3 percent NISP) were more abundant than any other taxon. The presence of eggshell and bones with medullary deposits indicates they were hunted en masse in the late spring or early summer, probably during their annual molt (Arnold 1981:116). Later Dorset sites from the High Arctic to Labrador often contain large frequencies of bird remains (e.g., Bendix 2000; Darwent 2001; Darwent and Foin 2010; Jordan 1980; Mary-Roussilière 1976). One Middle Dorset context in northern Labrador, described as “a solid mass of bird bones,” indicates the specialized seasonal procurement of birds in the *Procellariidae* family (Cox and Spiess 1980:662).

Migratory birds often occur in high frequencies in many Neoeskimo assemblages. At Deering, Alaska, proportions of migratory bird taxa prompted Moss and Bowers (2007), to propose intensive midsummer birding by Iqutak and intensive late spring

birding by Western Thule. In the Mackenzie Delta region, one of the world's great bird nurseries, some Neoeskimo assemblages in interior areas are composed of more than 40 percent bird remains, often dominated by ptarmigan and migratory duck (Betts 2005). In the Eskimo Lakes region, exploitation of resident ptarmigan was so productive that it partially underwrote year-round settlement and may have led to the development of a unique ethnic group (Betts 2009).

Furbearers (*Leporidae*, *Canidae*, *Ursidae*, *Mustelidae*)

For Arctic hunter-gatherers, furbearing mammals were often critically important for fur and other products, provided supplementary nourishment, and figured prominently in dress and ideation. At the Paleoarctic Broken Mammoth site, a range of furbearers, including bear (*Ursus* sp.), river otter (*Lontra canadensis*), and small rodents were recovered, but only arctic fox (*Alopex lagopus*) and arctic hare (*Lepus arcticus*) were found in significant quantities (Yesner 2001:321). Arctic fox are very abundant (second only to birds by NISP) at the Early Pre-Dorset Upper Beaches component at Port Refuge (Darwent 2001; McGhee 1979). Other Pre-Dorset and Dorset sites in the High Arctic also contain abundant fox remains (Darwent 2001; Meldgaard 2004).

Arctic hare were the second most important contributor to faunal assemblages in Early Pre-Dorset sites on Ellesmere Island (Sutherland 1996). Similarly, Darwent (2001) has identified a high frequency of hare bones in some High Arctic Pre-Dorset and Dorset sites. Arctic hare bones are also prevalent in many High Arctic Thule assemblages, where they appear to increase in frequency through time (McCollough 1989; Schledermann and McCollough 2003). So intense was hare procurement during Thule times in this region that they were likely hunted using constructed rock features similar to caribou drives.

Sea otters (*Enhydra lutris*) were particularly important to Aleut subsistence strategies over the last 4,500 years and appear in significant frequencies in many sites (Betts et al. 2011; Crockford et al. 2004). On Sanak Island, their frequency seems to be inversely correlated with that of Steller sea lion (*Eumetopias jubatus*) (Betts et al. 2011). Lech et al. (2011) have noted increases in cut mark frequency on sea otter bones (filleting) which correlate with periods of human population increase and resources stress.

While grizzly (*Ursus arctos horribilis*) and polar bears (*Ursus maritimus*) loom large in many Arctic ideational systems (e.g., Betts et al. 2015); their relatively low densities and limited use as food animals meant that they were generally not exploited in large numbers, and therefore occur in small frequencies in most Arctic sites (Murray 2008).

Beluga Whales (*Delphinapterus leucas*) and Narwhal (*Monodon monoceros*)

In Alaska, beluga and/or narwhal remains have been recovered from multiple contexts, but in limited quantities. The Choris (Giddings and Anderson 1986:228), Norton

(Giddings 1964:186), and Ipiutak (Giddings and Anderson 1986:154) faunal assemblages at Cape Krusenstern contained few beluga remains, suggestive of nothing more than sporadic and/or opportunistic hunting or scavenging. At Nukleet (Giddings 1964:96), beluga comprised just 3 percent of the total faunal assemblage (NISP), a frequency that Bockstoce (1979:76) indicates is similar for Cape Nome. Similarly, faunal assemblages spanning the Birnirk to Late Thule contexts at Walakpa on the Alaska North Slope display less than 1 percent beluga remains by NISP (Stanford 1976:69–71).

In the Eastern Arctic, evidence for the exploitation of small whales is nearly absent in Paleoeskimo faunal assemblages, with trace amounts occurring in sites such as Nipisat (Gotfredsen and Møbjerg 2001:143) and Qeqertasussuk (Meldgaard 2004:126), most likely reflecting a lack of whaling technology, and in later times, appropriate watercraft (Savelle 1994). Faunal evidence for Neoeskimo use of small whales is rare in the Eastern Arctic, a situation Savelle (1994, 1995) attributes to a number of possible factors, including limited excavation of warm season sites, taphonomy and transport issues, and a possible scheduling conflict with bowhead whales.

In contrast, beluga whales formed a focal component of subsistence in the Western Canadian Arctic. At the Mackenzie River Delta, specialized procurement of belugas has occurred since the earliest Thule times (e.g., Betts and Friesen 2004; McGhee 1974). Catastrophic mortality profiles from sites on the East Channel of the Mackenzie River reveal that this hunt likely took the form of a communal mass “drive” of hunters using kayaks and harpoons (Friesen and Arnold 1995b). By calculating edible meat weights for all species in the large Kuukpak House 1 faunal assemblage, Friesen and Arnold (1995a) determined that beluga provided at least 66 percent of available meat in this context. The immense productivity of the East Channel hunt is further exposed by evidence that groups transported, and probably traded, the proceeds of the hunt to other Mackenzie Inuit socioterritorial groups (Friesen and Morrison 2004). Using multiple faunal assemblages spanning three sites and nearly 500 years, Betts and Friesen (2004, 2006) documented a process of economic intensification underwritten by the specialized East Channel beluga hunt. Even at maximum human population levels, ca. A.D. 1500, this hunt likely did not reduce beluga numbers, though a behavioral response to this predation is likely visible in variable frequencies of beluga remains in the initial parts of the sequence (Betts and Friesen 2006).

Bowhead Whales (*Balaena mysticetus*)

The role of bowhead whaling in Arctic subsistence economies has been prominent in research agendas since Mathiassen (1927:182) declared that it was “the whole fundament of Thule culture”—an interpretation inspired by the cultural evolutionary schema of his contemporaries Steensby (1916) and Birket-Smith (1929). Unfortunately, a host of cultural and natural taphonomic processes are known to distort the signature of mysticete remains in faunal assemblages, which has led to difficulties in assessing both the existence and the intensity of bowhead whaling in Arctic contexts. First, extreme size sorting caused by the

large size of bowhead bones can result in a dearth of elements in and around Neoeskimo houses, where the majority of archaeological excavations have occurred (e.g., Stenton and Park 1994). Second, the use and reuse of bowhead bones as architectural elements at sites in the Eastern Arctic has distorted the frequency of cetacean remains at these sites, potentially overemphasizing the role of whales (e.g., Freeman 1979).

In spite of these taphonomic obstacles (and the early cautionary works of Taylor 1966 and Freeman 1979 which highlighted them), more than 30 years of intensive zooarchaeological research has now documented the specialized, selective, and intensive hunting of bowhead whales by Neoeskimo groups. Using biometrical analysis of bowhead bone assemblages, researchers have demonstrated size and age selective hunting, with ca. 8–9-meter yearling whales occurring in greatest frequency (Savelle and McCartney, 1994, 1999).

Comparison of naturally stranded whale bone assemblages to these cultural-derived assemblages (Savelle 1996; Savelle and McCartney 1990, 1991, 1994; Savelle et al. 2000) has demonstrated that this age or mortality profile is significantly different from natural whale populations. Combining these biometrical approaches within a broadly based framework that incorporates site structure, faunal remains, and site location, researchers have clearly demonstrated the presence of a specialized Neoeskimo whaling economy in the Eastern Arctic (McCartney 1980; McCartney and Savelle 1985; Savelle and McCartney 1988, 1990, 1991, 1999). While bowhead bone and baleen occur in many pre-Neoeskimo contexts, there is little convincing evidence that any of these groups regularly hunted large whales (Savelle and McCartney 2003:179; see also Ackerman 1998; Darwent 2006).

Whaling success rates have been estimated for sites in the Central Canadian Arctic by calculating the minimum number of individuals per dwelling represented in architectural and depositional bone (Savelle 1996, 2000). These data indicate success rates were much higher in “core” bowhead whaling zones and fell off precipitously in peripheral areas. Savelle (1996:46) links differences in whaling success to differences in social structure, with more complex groups inhabiting large villages in productive core whaling areas. Savelle (2000:84) proposes a recursive relationship between success rates, village size, and social complexity, whereby success rates increased when village sizes increased through the development of village-wide information networks, which he believes can be identified by “the nature and extent of *kariyit* and ‘bone conspicuous’ dwellings.”

Biometric techniques have also been applied to multiple Neoeskimo sites in the Western Arctic, again displaying the preferential selection of whales ca. 8–9 meters in length (McCartney 1995; Savelle and McCartney 2003). In the Mackenzie Delta region, erosion, ice scouring, and the use of driftwood in architecture have created a situation whereby bowhead bone is rare in archaeological assemblages, despite early historic accounts of intensive bowhead whaling (Richardson, in Franklin 1828:217). Betts and Friesen (2004) have recently addressed this issue by conducting a regional comparison of vertebrate frequencies at coastal sites, identifying the presence of specialized bowhead whaling by assessing structured differences in relative frequencies of taxa between potential whaling and nonwhaling contexts.

Many studies have addressed element frequencies in sites rich with bowhead bone. Savelle (1997) has demonstrated that architectural utility is the primary factor mediating

the distribution of whale bone skeletal elements on Arctic sites (e.g., Savelle 1997; Savelle and McCartney 2003:180). Additional factors which likely impacted bowhead element frequencies include the fact that certain body parts, including tails and flippers, were associated with high social status (e.g., Rainey 1947; 2002:67, 72, 73), and that whales and their skulls (and indeed whaling in general) were associated with complex ritual and symbolic meaning (Patton and Savelle 2006; Savelle and Vадnais 2011).

Because of the severe cultural taphonomic biases which impact the frequency and distribution of archaeological bowhead bone, researchers are often uncertain how to incorporate these megafaunal remains into dietary reconstructions (e.g., Staab 1979:362; Whitridge 2002:66; see discussion in McCartney and Savelle 1985:41–42; Savelle and McCartney 2002:367). Whitridge (1999:110) has suggested that to overcome biases caused by architectural utility and large size, smaller whale bone elements, such as forelimbs, caudal vertebrae, and phalanges, are the best indicators of relative bowhead abundance (procurement) in Neoeskimo sites. Using similar nonarchitectural elements to calculate an MNI, Betts and Friesen (2013) have recently estimated the dietary contribution of bowhead to be as high as 70–80 percent of all the edible animal products in some Mackenzie Inuit sites. This is in accordance with the dietary contribution of belugas in adjacent focal whale hunting contexts (Friesen and Arnold 1995a).

Pinnipeds (*Otariidae*, *Odobenidae*, *Phocidae*)

A testament to the marine orientation of most Arctic hunter-gatherers, pinnipeds are a ubiquitous contributor to nearly all faunal assemblages derived from coastal sites. In southern Alaska and the Aleutians, archaeofaunal remains reveal that Steller sea lions and northern fur seals (*Callorhinus ursinus*) were crucially important to the subsistence strategies of most Aleut from at least 4500 B.P. (e.g., Betts et al. 2011; Crockford et al. 2004; Tews 2005; Yesner, 1988). On Sanak Island, initial colonization of local rookeries by otariids, followed by behavioral adjustments to human predation, may be linked to wildly fluctuating frequencies prior to ca. 2500 B.P. (Betts et al. 2011), while climatic regime shifts may correlate with abundance in the last two millennia. Phocid seals are often the second-highest contributor to faunal assemblages on Sanak, likely a product of the proximity of Sanak Island to otariid haulouts and rookeries. This situation mirrors the distribution at Amaknak Bridge, where small seals were abundant but less frequent than otariids (Crockford et al. 2004:Table 2). Similarly, at Umnak Island, fur seal remains are most frequent in mammalian faunal assemblages, followed by sea lions and small seals, respectively (Yesner 1988). Crockford et al. (2004:77) indicate that pinniped remains from Amaknak Bridge provide evidence for a number of summer or fall harvest strategies, including “at sea, on local island haul-outs and rookeries, and from offshore pack ice.”

While faunal remains from the Denbigh Flint Complex are limited at many contexts, burned seal remains suggest the importance of sealing at some sites (e.g., Hall 1975). At Cape Krusenstern, phocid seal are very abundant in Choris contexts (Giddings and Anderson 1986:Figure 157), and small and bearded seals (*Erignathus barbatus*) are

the most frequent taxa in Norton assemblages from Cape Denbigh (Bockstoe 1979; Giddings 1964, 1967). Fauna from the winter Old Whaling houses at Cape Krusenstern indicate a focus on small seals (Giddings and Anderson 1986:Fig. 157). Darwent (2006:98) has proposed that the frequency of adult ringed seal (*Pusa hispida*) remains in these contexts indicates breathing-hole sealing, while the “summer” houses, dominated by juvenile seals, indicate a focus on lead edge sealing. Later Ipiutak archaeofaunas at Cape Krusenstern and more northerly sites are also dominated by phocid remains (Darwent 2006; Giddings and Anderson 1986;; Mason 1998; Saleeby 1994). As demonstrated at Cape Krusenstern, walrus (*Odobenus rosmarus*) were apparently insignificant contributors during much of this early period in northwestern Alaska (Giddings and Anderson 1986:Fig. 157).

Later Neoeskimo contexts at Cape Krusenstern tend to be dominated by caribou, but small seals remain a significant contributor (Giddings and Anderson 1986:Figure 157). However, an extensive analysis of faunal remains at Walakpa, northern Alaska, demonstrates the importance of sealing to Birnirk and Thule groups in the Western Arctic (Stanford 1976). During Birnirk times, phocid seals accounted for more than 60 percent (NISP) of the faunal assemblages, a frequency which is generally consistent with early Thule contexts. By Late Thule times, seals are slightly less frequent, generally less than 50 percent NISP. In the Western Canadian Arctic, almost all coastal Thule winter house contexts have faunal assemblages dominated by ringed seals (Betts 2005; Morrison 1983a). Using the analysis of dental annuli, Morrison (1983a:266) indicated that most of the Early Thule seal remains at the Clachan site in Coronation Gulf were derived from spring or late summer or fall hunting episodes along the ice edge.

Phocid remains are similarly abundant in faunal assemblages at Early Thule sites in the High Arctic (Darwent and Foin 2010; McCullough 1989), where they occur in dominant frequencies in most contexts. Walrus were also an important contributor to the faunal assemblages, sometimes accounting for more than 25 percent (NISP) of the faunal remains. Similar to that at the Coronation Gulf sites, analysis of dental annuli of ringed seals from High Arctic sites indicates that seals were hunted primarily in the spring, summer, or fall from basking locations and the ice edge (McCullough 1989). As noted by Morrison (1983a:260), “High frequencies of immature individuals may in fact characterize many Thule ringed seal assemblages,” a pattern that has since been recognized in many other Thule assemblages (e.g., Danielson 1994; Park 1999). This ubiquitous trait has led Park (1999) to speculate that seals hunted during the spring and summer were often butchered and stored for later use during the darkest winter months.

The development of the classic ethnographic pattern of specialized breathing-hole sealing from large igloo-villages on the sea ice, while hinted at by several artifactual indicators such as fixed foreshafts, sealing stools, and snow probes (e.g., Morrison 1990), has not been convincingly demonstrated using faunal remains. Morrison (1983b) has argued specialized breathing-hole sealing was an adaptation to the colder conditions of the Little Ice Age. The associated reduction in the ability to hunt bowhead whales was likely a primary determining factor in its development, at least in the Central Arctic (e.g., Savelle and McCartney 1988). Regardless, the pattern of winter villages on the sea

ice, where the majority of these seals were butchered and consumed (and where their bones were discarded) may effectively render this adaptation zooarchaeologically invisible. However, in Labrador, Woollett (2010) has documented evidence of breathing-hole sealing from shoreline villages in Oakes Bay, dating to the seventeenth and eighteenth centuries. Dental thin sections reveal that adult ringed seals occurred in the highest frequency, and that these adults were predominately taken during the winter and spring—the expected mortality profile for a breathing-hole sealing adaptation.

If whaling is the “whole fundament” of Thule culture in the Eastern Arctic (Mathiassen 1927), then surely sealing (and to a lesser extent walrus hunting) is the whole fundament of Eastern Arctic Paleoeskimo culture. Phocid seals are the most abundant taxa in the majority of the earliest Pre-Dorset sites (Darwent 2001, 2003; Helmer 1991; McGhee 1979, 1981). Dental increment analysis of seal teeth has revealed that hunting took place during all seasons, with a focus on summer and fall hunting from the ice edge (Helmer 1991; McGhee 1976, 1981). This emphasis on small seals is revealed in Early Paleoeskimo and Dorset faunal assemblages throughout the Canadian Arctic (Arnold 1980; Cox and Spiess 1980; Darwent and Foins 2010; Desrosiers 2009; Gotfredsen and Møbjerg 2004; Jordan 1980; Murray 1999; Spiess 1978; Taylor 1968). At the extreme southern and eastern margins of their range, Saqqaq and Dorset contexts reveal that harp seals (*Pagophilus groenlandicus*) were sometimes the focus of procurement activities (Hodgetts, 2005a, 2005b; Hodgetts et al. 2003; Meldgaard 2004).

In a detailed analysis of High Arctic Dorset faunas, Darwent (2004) has demonstrated a strong negative correlation between assemblage evenness and ringed seals and a weak but positive trend toward greater reliance on pinnipeds over time. An abrupt increase in the frequency of walrus in Early Dorset faunal assemblages followed by a moderate decline in walrus remains in late Dorset contexts seems to characterize many sequences (Darwent 2004; Murray 1999). Darwent (2004:70) attributes the Early Dorset increase in walrus exploitation to technological innovation, and the Late Dorset decline in walrus exploitation to warming climatic conditions.

A focus on lead-edge sealing, rather than breathing-hole sealing, seems to be a critical economic characteristic of Paleoeskimo groups in the east. In a recent review of Early Paleoeskimo sites in the Arctic, Murray (2005) utilized dental increment and epiphyseal fusion analysis to document a reliance on juvenile seals at ice cracks and leads during the winter—a pattern that approximates the strategies of polar bears in similar environments. Similarly, at the Lagoon site, Arnold (1981:121) proposes late spring or early ice-edge hunting based on the frequency (40 percent NISP) of subadult remains in the assemblage. In a detailed analysis of epiphyseal fusion rates of *Phoca* sp. remains in Middle Dorset assemblages in northern Labrador, Cox and Spiess (1980) document a focus on juvenile seals, which would prefer the lead edge or sina (only adult seals can maintain breathing holes). This evidence is corroborated by dental thin sections, which reveal that adult small seals were killed in fall and late winter or spring, rather than in the midwinter at their breathing holes (Spiess 1978:53). Although a different species (harp seal) was the focus of procurement activities at Phillip's Garden, late winter and spring hunts from ice edges and leads are also indicated (Hodgetts 2005a:103).

Darwent (2001) conducted an in-depth analysis of skeletal part frequencies for pinnipeds in High Arctic Palaeoeskimo assemblages and revealed varying patterns based on size. From Early Pre-Dorset to Late Dorset times, small seals were typically brought back to sites whole, with all elements represented in the assemblage (see also Helmer 1981), a pattern that appears to characterize Paleoeskimo faunal assemblages dominated by small seals (e.g., Murray 1992). However, larger seals and walrus were sometimes butchered and the high meat-utility elements transported back to camp (Darwent 2001). The butchery of large pinnipeds has also been studied for sites spanning the last two millennia on Sanak Island, in the Eastern Aleutians. Lech et al. (2011:123) indicate that element representation varied with climatic regimes such that low-utility elements were frequent during periods of low otariid populations (warm regimes) and higher-utility elements were frequent during periods of high otariid populations (cold regimes), indicating that more of the otariid carcass was exploited during periods of climatic and population stress.

Caribou (*Rangifer tarandus*)

Available in numbers that permitted mass harvesting, following seasonally predictable migration routes, and providing high-quality furs, antler, and other byproducts, caribou were an essential component of most Arctic and Subarctic economies. Caribou are present in faunal assemblages from Paleoarctic and Northern Archaic sites in Northern Alaska and Yukon (Clark 1991; Dumond 1981; Yesner 2001), but typically are not the most abundant taxon. Denbigh Flint Complex, Choris, and Norton sites in Alaska often contain little faunal material (e.g., Darwent 2011:48), but where adequate samples have been recovered, caribou seem to have been a seasonal focus (Anderson 1988; Darwent 2011:48; Giddings 1967:213; Giddings and Anderson 1986:228). Further east, caribou are the most abundant identified species in Shield Archaic, Arctic Small Tool Tradition, and late prehistoric interior sites (Gordon 1975, 1996; Still 1991).

The fall caribou hunt appears to have been a primary component of most Neoeskimo seasonal economies in all regions of the Arctic (Grønnow et al. 1983; Morrison 1997:81). Many of these hunts took place at water crossings where kayaks could be used to dispatch caribou in the water (e.g., Friesen and Stewart 2004;). Drive systems were also used to funnel caribou to these locations, and shooting blinds have been recorded at Neoeskimo drive systems (e.g., Brink 2005; Grønnow et al. 1983:45; Morrison 1997:80). In many instances, the productivity of the fall caribou hunts seems to have underwritten winter settlement (e.g., Friesen 2001; Friesen and Stewart 2004; Morrison 1988, 1997; Morrison and Whitridge 1997; Norman and Friesen 2010;), a pattern made possible by intensive processing, drying, and storage of caribou remains, as evidenced by element frequency distributions (Friesen 2001; Friesen and Stewart 2004; Grønnow et al. 1983; Morrison 1988, 1997). Repeated long-term exploitation of caribou in these locales and the subsequent reduction in seasonal movements in some locations may be related to the emergence of distinct ethnic groups (e.g., Betts 2009). Morrison (1988:87) has

speculated, based on element distributions, that meatier caribou remains may have been transported out of these seasonally occupied caribou-hunting camps to provision larger coastal villages. However, such reverse utility patterns are common at many archaeological sites due to density mediated attrition, and thus in many Arctic sites such element profiles are likely significantly impacted by bone attrition (e.g., Howse 2008: Figs. 9 and 10). Finally, Morrison and Whitridge (1997; see also Morrison 1997) have estimated the age and sex of caribou using measurements of molar crown heights, demonstrating that in the Western Arctic drive-based fall caribou hunts resulted in catastrophic mortality profiles, meaning hunters did not actively select for specific ages or sexes.

Alternatively, Nagy (1990) has documented the importance of the spring caribou migration in Neoeskimo subsistence economies on the Yukon North Slope, where caribou remains account for more than 54 percent of the faunal assemblage (NISP). Analysis of fetal caribou bones suggests procurement was coincident with the limited spring or early summer calving period, and involved “individualistic hunting” rather than mass hunting techniques (Nagy 1990:37), an interpretation she bases on the low MNI values (8) determined from the assemblages. However, the age profile (determined from tooth eruption sequences) includes a range of infant, subadult, and adult individuals, and strongly indicates mass hunting.

Despite a strong orientation toward marine economies, caribou were also seasonally important to Paleoeskimo groups. Caribou were seasonally critical to early Paleoeskimo occupation in the Western Canadian Arctic, accounting for at least 55 percent (NISP) of the faunal remains at the Crane site. Le Blanc (1994) demonstrates that this was a spring or summer hunt where animals were killed, butchered, and consumed in close proximity to the residential site. In Saqqaq contexts in Nipisat, in southwestern Greenland, caribou accounted for more than 30 percent of the mammalian assemblage in all phases, although there was a gradual shift away from a focus on seals in the earliest phases to an emphasis on caribou, which by Phase 3 account for over 55 percent of the mammalian remains (Gotfredsen and Møbjerg 2004:143). This contrasts with archaeofaunas at the Saqqaq site of Qeqertasussuk, which had very few caribou remains (Meldgaard 2004:112). In general, High Arctic Palaeoeskimo faunas contain little caribou bone (Darwent 2001), providing a rationale for the higher frequencies of muskox (*Ovibos moschatus*) in some of these contexts. In the Central Arctic, Murray (1996, 1999) has identified an apparent shift away from a marine-focused subsistence economy (seals and walrus) toward increased reliance on caribou from the Early Pre-Dorset thorough Late Dorset periods. By the Late Dorset period faunal remains are composed of relatively even proportions of caribou, small seals, and walrus, though caribou never contribute more than 30 percent NISP (Murray 1999: Figure 4).

The exploitation of seasonal caribou migrations is evident in Dorset sites throughout the remainder of the Arctic Archipelago and mainland (Arundale 1976; Julien 1980; Mary-Rousselière 1976). For example, the Late Dorset Bell site on southern Victoria Island preserves evidence of an intensive caribou hunt that took place during late summer or early fall (Howse 2008:35) which was likely aided by an extensive drive system in the area (e.g., Ryan 2009:222). Element frequencies, which display a negative correlation

with the Meat Drying Index developed by Friesen (2001), indicate that meat drying took place at the Bell site and that fall subsistence focused on elements not suitable for drying (Howse 2008:35). This implies that the dried caribou meat was utilized for winter consumption, potentially in winter snow houses constructed on the nearby sea ice (Ryan 2009).

Bison (*Bison priscus*, *Bison bison*)

In interior Alaska, Paleoarctic faunal assemblages like those from Broken Mammoth (Cultural Zone 3) are dominated by *Bison priscus* (55 percent NISP), with lesser inputs from caribou and waterfowl (e.g., Yesner 2001:321). Element distributions of the bison remains indicate that whole carcasses were being returned to camp for consumption. This evidence mirrors species frequencies in assemblages from early sites in western Yukon (Clark 1991:35), which are dominated by bison, with significant quantities of caribou, hare and waterfowl. Following this early period, bison remains are exceedingly rare in Arctic archaeological sites. Morrison (1997) recovered a single wood bison (*Bison bison athabasca*) skull (with cut marks) in a Mackenzie Inuit context at the aptly named Bison Skull site in the eastern Mackenzie Delta region, which he interpreted as an individual from a relict Late Holocene herd.

Muskox (*Ovibos moschatus*)

Knuth's (1967) seminal work on the earliest Paleoeskimo inhabitants of the Eastern Arctic has had a profound influence on the way in which subsequent researchers have understood Early Pre-Dorset lifeways. Some of the Greenland faunal assemblages analyzed in Knuth's report did contain muskox bones in dominating frequencies (see Darwent 2001), leading him to propose that "Independence I culture elements must altogether be set in relation to hunting of the musk-ox" (Knuth 1967:34). To Knuth, this corroborated Steensby's (1916) early suggestion that Independence I people followed a "Musk-Ox Way," and thus Knuth's interpretation can be viewed as adhering to the cultural evolutionary schema of a much earlier era (Birket-Smith 1929; Steensby 1916). Unfortunately, this muskox-focused interpretation remains persistent in published literature. Despite over 30 years of faunal research that displays the primary importance of marine mammals, especially seals, to Early Pre-Dorset groups (see discussion above and Darwent 2001, 2003; McGhee 1976, 1979), researchers have continued to promote the muskox model and, by extension, its evolutionary undertones (e.g., McGhee 1996:47, 2004:49; Maxwell 1985:62).

This is not to say that muskox were not an important part of Early Paleoeskimo economies. Recent research by Darwent (2001, 2003) suggests that inland sites in Peary Land and adjacent areas contain high frequencies of muskox, based on NISP, though it should be noted that pinniped remains were present in significant (and often greater) quantities

in many assemblages (e.g., Darwent 2003:Figures 1 and 2). In many of these assemblages, muskox bone was often spirally broken and burnt, suggesting significant extraction of marrow and bone grease, as well as use of bone as fuel (Darwent 2003:Appendices 2 and 3). Detailed analysis of muskox interception strategies through mortality profiles has not been undertaken for this period; however, domestic dogs, which are often thought to be critical to the pursuit of muskox (e.g., McGhee 1996:55) are practically absent from Early Paleoeskimo faunal assemblages (Darwent 2003:40, 343).

Later Pre-Dorset assemblages on Banks Island indicate a significant (90 percent NISP) focus on muskox (Münzel 1983), while other sites indicate a lesser focus on muskox, in lieu of seal hunting (Arnold 1981). Migratory bird species at these Banks Island sites suggest muskox were intercepted during the spring and summer. Early Dorset assemblages on Bathurst Island (Helmer 1981) contain nearly even frequencies of phocid seals and muskox. The frequency of migratory birds in this assemblage also suggests a summer muskox hunt. In general, the evidence from later Paleoeskimo periods, where primarily marine adapted groups exploited muskox seasonally if they were locally available, is not significantly different from the Early Pre-Dorset pattern.

Analysis of element frequencies from Early Pre-Dorset sites in the High Arctic indicates a positive correlation with bulk utility at some sites, while whole carcasses were being brought back at others (Darwent 2001:51–53). Element frequencies at a Pre-Dorset site on Banks Island indicate high numbers of meat-bearing bones, suggesting preferential transport from a distant kill site (Arnold 1980). Helmer (1981) has examined the element distribution of muskox remains at an Early Dorset site, documenting that this species was butchered elsewhere with meat-bearing elements preferentially brought back to camp (see also Darwent 2001:95).

Neoeskimo use of muskox is poorly documented across much of the North American Arctic (e.g., Darwent and Darwent 2004). However, Friesen and Stewart (2004) have located a significant muskox hunt at an early Caribou Inuit site on the Kazan River, in which muskox contributed to the faunal assemblages in frequencies nearly equal to caribou, with muskox likely contributing substantially more meat to the diet. Friesen and Stewart (2004:44) stress, however, “that the muskox hunting and consumption that is represented at this site is, in fact quite rare.” In this instance wolf or dog bones were recovered with assemblages containing muskox bone, suggesting they may have been used to hunt this species. Frequencies of fish and bird taxa, the nature of the architectural features, as well as local topography, suggest that the hunt may have occurred in the spring or summer (Friesen and Stewart 2004).

Mollusks

Shellfish use is a defining attribute of many ancestral Aleut sites (Crockford et al. 2004; Maschner et al. 2009; Yesner 1976, 1988). In general, shell midden research in this area is limited, and complex analyses, such as seasonality based on growth increments and isotope-based temperature reconstructions, have not yet been attempted. Preliminary

analyses of the archaeofaunas of Sanak Island reveal that periwinkles, urchins, mussels, chitons, and clams occurred in high frequencies at many sites, along with a diversity of other shellfish taxa (Maschner et al. 2009). Frequencies of shellfish in general remained stable over time, and differences are primarily correlated with proximity to different intertidal ecosystems. However, Maschner et al. (2009) have defined a potential negative correlation between shellfish exploitation and warm temperatures; for example, shell midden sites were virtually nonexistent on the island during the Medieval Climatic Anomaly, ca. 1100–700 B.P.

As may be expected, evidence of shellfish exploitation is limited to the southerly ranges of true Arctic-adapted groups. Evidence for Paleoeskimo exploitation of shellfish is nonexistent. Later Thule contexts on the Seward Peninsula contained small amounts of mussel, periwinkle, and whelk shells (Saleeby 1994), and some sites in Labrador contain a similar range of mollusks (Woollett 2010). This suggests that Neoeskimo groups exploited mollusks when available, although this never occurred in significant frequencies.

PALEOBIOLOGY AND PALEOECOSYSTEM RESEARCH

The excellently preserved faunal assemblages recovered from Arctic sites do not only contain information on human lifeways, but also encoded significant information about ancient animal populations and ancient ecosystems (Murray 2008). Given the susceptibility of Arctic regions to climate change, this research has increasingly become central to research designs and funding proposals.

Much work has occurred with the excellently preserved shell midden faunas of the Aleutian Islands and southwestern Alaska. Crockford et al. (2007) have recently used the frequency of ice-adapted seals at Amaknak Bridge to speculate on the extent of sea ice cover on the southern Bering Sea during the Late Holocene. Causey et al. (2005) have tracked the human and climactic impacts on birds, documenting local depletions in the Aleutian Islands. Similarly, Yesner (1976) has developed a population history for albatrosses based on archaeofaunas. Simenstad et al. (1978) have explored the human impact on sea otter populations, and the subsequent destruction of kelp forests by urchins, a primary resource for otters. Maschner et al. (2009b) have used faunal remains and paleogeographical data to track the impact of the Medieval Climatic Anomaly on the North Pacific ecosystem. Maschner et al. (2009a) have also attempted an extensive analysis of the paleoecology of Sanak Island over ca. 4,500 years. This research has tracked the relationship between otariids and changing seal, sea lion, and sea otter frequencies (Betts et al. 2011) and Pacific cod (Betts et al. 2011; Maschner et al. 2008). Further insights from the project include a detailed assessment of changing trophic position and food webs between prehistoric and modern populations and a consideration of the shift in intertidal shellfish communities (Maschner et al. 2009a).

Such paleoecological research has been applied to Arctic faunas in other areas to great effect and holds great promise for understanding baseline (preindustrial) ecosystem parameters in the North. For example, food webs have been constructed from the Saqqaq-period faunas from Qeqertasussuk (Meldgaard 2004:170). Darwent and Darwent (2004) have tracked the mid- to late Holocene distribution of muskox in the Eastern Arctic, noting that its range was much more extensive than in modern times. Murray (2008) has tracked the frequency of marine mammals in middens across the Arctic, and while her data are preliminary, she indicates that shifts in the range of certain ice-adapted Arctic fauna are apparent, especially in Subarctic areas of Alaska, the Aleutians, and Labrador. Savelle (2010) has used data regarding the number of individuals represented by bowhead bone in archaeological sites in the Eastern Arctic to estimate that as many as 18,500 individuals were removed from the stock over the period A.D. 1200–1500 (ca. 62 whales removed per year), indicating the Thule Inuit were significant factors in the natural ecology of bowhead whales. Moss and Brower (2007) have documented the intensity of bird exploitation during summer months over approximately 1,300 years, noting that government-imposed harvest rules were at odds with traditional harvest strategies to which both humans and birds had adapted over many centuries. Finally, Woollett et al. (2000; Woollett 2010) have discovered relationships between changing sea-ice conditions and phocid seal frequencies in archaeological sites from Labrador to Newfoundland, using them to understand the long-term stability and reoccurrence of polynyas.

CONCLUSIONS

Animal remains from Arctic sites have been central to reconstructions of human lifeways for over 90 years. Summarizing such diverse research is exceptionally difficult, but in general, archaeofaunal research has revealed both the extreme diversity and malleability of ancient Arctic economies and the fine-grained manner in which ancient populations exploited their environments. Many groups exhibited a diverse range of seasonal and focal adaptations to differing regional ecosystems and animal populations, but within set technological and organizational capabilities. Recurring interactions with their prey and the products they provided shaped their seasonal movements, technologies, architectures, social systems, and religion, in short, structuring their very identity (self-perceived and as archaeologists perceive them).

The superb quality of many archaeofaunas demands and deserves the application of increasingly complex analytical and theoretical techniques, yet much basic methodological work remains to be done. Detailed research on the complex taphonomic histories of the assemblages derived from semisubterranean houses, tent rings, middens, storage areas, and other features is desperately required to provide a baseline for assessing potential sources of bias (e.g., Friesen and Betts 2006; Lofthouse 2003;). Research into the social and ideational relationships between humans and animals is also critically required; if such relationships are to be examined with archaeofaunas, then

well-preserved permafrost assemblages must represent the best potential case studies for the application of complex social and ideational theory.

Finally, applied zooarchaeology, which examines the structure of ancient animal populations and ecosystems, can provide a baseline record against which to compare biased historical and modern ecological data. As Arctic ecosystem scientists and biologists begin to realize the solution to the “shifting baselines syndrome” may be found in archaeofaunal data, and that “natural” ecosystems are products of thousands of years of human interaction (Maschner et al. 2009a:700), archaeofaunal research will become central to many studies of the ecosystem impacts of climate change.

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CHAPTER 4

A CRITICAL RESOURCE

Wood Use and Technology in the North American Arctic

CLAIRE ALIX

[W]e should not forget the overall constraints of the archaeological evidence. No studies, singly or combined, can fully illuminate the character of ancient communities. The study of woodworking technologies will at the very least open one window upon the darkened structure of early societies, and the archaeologist who neglects such an obvious source of illumination must be prepared to operate in unnecessary gloom.

Coles 1982:6

E. S. BURCH in *Social Life in Northwest Alaska* reminds us that in nineteenth-century Inupiaq societies, the main factor in settlement location was, of course, “relative resource abundance . . . of caribou, in the interior, and of sea mammals, on the coast,” but also “the availability of fuel, house building material, and drinking water” (Burch 2006). Wood resources were necessary for hunting and fishing implements and critical for building, heating, and lighting shelters and houses. Remembering life on the tundra, Yupik elder George Billy recalled that wood and water were indeed two essentials needed to set a comfortable camp.

On the treeless Arctic tundra, wood was often lacking and inhabitants frequently had to find substitutes. The main source of Arctic wood is driftwood, a renewable resource originating in the taiga of Siberia and North America (Figure 4.1). Undercutting erosion and the action of spring river-ice breakup are responsible for trees falling in rivers. They then float to the sea and travel with ice, winds, and currents before washing to shore and accumulating in small bays and gullies (Alix 2005). As the primary source of wood, driftwood has been a “precondition of the life of the Inuit” (Grønnow 1996). Local shrubs were also used and trips to forested areas occurred, especially where driftwood was scarce, such as documented historically among the Copper, Caribou, or Northern Quebec-Labrador Inuit. Trade of wood in the form of driftwood, greenwood, or worked



FIGURE 4.1 Driftwood pile near Hooper Bay, southwestern Alaska, June 2004.

Photograph by Claire Alix

wooden objects is also reported, and its procurement was an integral part of the Inuit subsistence cycle (Burch 2006; Jenness 1922, 1946; Stefánsson 1919).

In areas where this precious commodity was abundant—such as Norton Sound or the Mackenzie Delta—driftwood remained eagerly awaited; its arrival often following shortly the end of the annual spring river breakup. The diversity, availability, and renewal of driftwood varied through time and space due to environmental and climatic conditions, and the effects of extreme meteorological events (Hellmann et al. 2013). As a result, there always was uncertainty with its “delivery” and thus procurement (Alix 2007). Reports of claims, marks of ownership, trade, travel to procure wood, and even fights over the resource are all reported throughout the Arctic and Subarctic region from the North Pacific coast to the North Atlantic regardless of cultural identity.

In the past 20 years, interest in archaeological wood has been steadily growing and the importance of wood resources for sustaining life in the Arctic is now an accepted understanding (Alix 2009; Deo Shaw 2012; Eggertsson and Laeyendecker 1995; Fitzhugh et al. 2006; Grønnow 1996; Laeyendecker 1993). Research on the Labrador coast near the tree line has even shown the extensive impact of eighteenth-century Inuit on the landscape, where the cutting of trees led a forested bay to become tundra-covered (Kaplan 2009). Despite growing datasets, archaeological wood remains are yet to be systematically sampled and analyzed. Consequently, the overall understanding of change in wood availability and use remains sketchy. Wood is not only of interest as a resource that was critical and wanting. It is also essential as a research material because it carries multiple

signatures and stories that link its origin in the interior boreal forest to where it ended up on the coast. These signatures can be recorded in part through xylology and dendrochronology, and offer great potential for long-term climatic reconstructions (Juday and Alix 2012), tree-ring dating of site structures (Giddings 1952b), and analysis of wood availability, use, and technology.

THE NATURE OF WOOD RESOURCES IN THE ARCTIC

Apart from the “Woodland culture” of the forested Kobuk River and a few groups who settled within the Mackenzie Delta and Labrador forest-tundra ecotone, most Arctic inhabitants lived beyond the latitudinal or altitudinal tree line. The origin of wood in the High Arctic had been questioned as early as the seventeenth-century European exploration (Eggertsson 1994). Finds of driftwood were essential in establishing the existence of a transpolar current across the Arctic Ocean. In the mid-twentieth century, Giddings (1952a) pioneered archaeological wood studies in Alaska and developed tree-ring research to determine the origin of driftwood and potential changes in Arctic sea currents and to date archaeological sites at a time prior to radiocarbon techniques. He built the first dendrochronologies on white spruce (*Picea glauca* [Moench] Voss.) for interior Alaska and the Mackenzie Valley and set the methodological basis for understanding logs’ transit time between death of the tree, delivery to a coast, and subsequent incorporation into a house frame. Unfortunately, systematic tree-ring analysis of archaeological wood was abandoned once radiocarbon dating techniques became available (Nash 2000).

A pile of driftwood on an Arctic coast is the end result of a series of processes that start inland along the shores of large forested Subarctic rivers. Ultimately, the fall and transport of logs are determined by local, regional, and more global environmental and climatic factors. Taxa composition of deposits is directly related to that of the circumpolar boreal forest, while their abundance and distribution is a matter of coastal characteristics, prevailing winds and currents, and the presence or absence of fast ice (Hellmann et al. 2013).

In North America, the boreal forest is dominated by white spruce and black spruce (*Picea mariana* [Mill.] B.S.P.) with some tamarack (*Larix laricina* [Du Roi] K. Koch), paper birch (*Betula papyrifera* Marsh.), aspen and cottonwood (*Populus tremuloides* Michx., *P. balsamifera* L.), and several species of alder and willows (*Alnus* spp., *Salix* spp.) (Viereck and Little 2007). In northeastern Siberia and all the way to central Siberia, two species of larch (*Larix dahurica* Turcz. and *L. sibirica* Ledeb.) dominate the taiga but increasing numbers of spruce (*Picea obovata* Ledeb.) are found as one gets closer to the Yenisei River. Further west, the boreal forest becomes dominated by pine (*Pinus sibirica* [Rupr.] Mayr and *P. sylvestris* L.) and spruce trees with occasional fir (*Abies sibirica* Ledeb.) (Hytteborn et al. 2005).

The distance from the arctic coasts to the interior wood-producing rivers, together with water velocity and river levels, and sea-ice circulation and conditions, impact the overall transit time and have an important effect not only on the abundance and availability of driftwood but also on the dimensions and qualities of the stranded logs (Alix 2005).

Driftwood in the Western Arctic

The Yukon, Kuskokwim, and Kobuk/Noatak river basins are the main wood contributors to the American and Russian coasts of the Bering and Chukchi seas. A smaller number of logs originate along the Anadyr River and potentially the Kamchatka River (Giddings 1952a). In the western Canadian Arctic, the large Mackenzie River basin provides most of the wood around its delta, westward along the Beaufort Sea coast to Point Barrow and eastward along the coasts of Amundsen Gulf and Victoria Island, where it becomes sparse (Eggertsson 1994). In terms of available species, the most abundant are the two North American spruces, the cottonwood, and several species of willows, while alder, paper birch, Siberian larch, and tamarack are found occasionally. On the Siberian side of Bering Strait, wood is not as abundant as in Alaska, and the coast receives a mix of Siberian larch and Alaskan spruce (Giddings 1952a). On both sides of the strait, however, specific places are known for their richness. Tree-ring research shows that transit time can be as short as one to two years between interior Alaska and the coasts of southwestern and northwestern Alaska. Similar transit times are found on the Mackenzie River (Eggertsson 1994).

Further south in the Kodiak and Aleutian Islands region, driftwood is more diverse, as the logs originate from the spruce hemlock forest of southeastern Alaska. Thus, logs are of Alaska and red cedar (*Chamaecyparis nootkatensis* [D. Don] Spach, *Thuja plicata* Donn), western and mountain hemlock (*Tsuga heterophylla* [Raf.] Sarg., *T. mertensiana* [Bong.] Carr.), Sitka spruce (*Picea sitchensis* [Bong.] Carr.), red alder (*Alnus rubra* Bong.), cottonwood and black cottonwood (*Populus trichocarpa* Torr. and Gray). Differential traditional uses of these taxa have been recorded (Deo Shaw 2012). Fragments of yellow and red cedar can be found as far north as Bristol Bay, where they are called “perfumed wood.”

Driftwood in Central Siberia and the Eastern Arctic

In Siberia, the Lena, Yenisei, or Kolyma are among the large rivers transporting logs. Not much is known in the English literature about the proportion of wood types along the Siberian coast. Bogoras (1904–1909) reported the presence of the “American pine” (probably spruce) among large amounts of larch that came down the Kolyma and ended on the neighboring coasts. Further west, a small collection of 38 fragments collected in 2001 by Daniel Odess on the modern shores of Zhokhov Island, were identified by the

author as *Larix* sp. (n = 11), *Picea* sp. (n = 7), *Picea* sp./*Larix* sp. (n = 5), *Pinus sylvestris* (n = 2), *Tsuga* sp. (n = 1), *Salix* sp. (n = 11), and *Alnus* (n = 1). These results raise the issue of a potential American origin of the spruce and hemlock fragments, although spruce could have come from further west along coastal currents.

In the eastern North American Arctic and Greenland, driftwood comes from both Siberia and North America and travels entrapped in sea ice (Hellmann et al. 2013). Annual sea-ice circulation follows two major current patterns, the anticyclonic Beaufort Gyre and the Transpolar Drift that crosses the Arctic basin from the East Siberian Sea to Fram Strait. Once stranded, driftwood may stay sound longer than in southern areas because of the cold and dry climate, and low bacterial activity, but it loses some of its elasticity. Where present, piles are composed of spruce and larch, with occasional pine, fir, poplar, and willow, and rarely hemlock. The earliest postglacial deposits are dated to ca. 9000 ¹⁴C B.P., and driftwood incursions into the eastern Arctic subsequently varied throughout the Holocene. Deflection and velocity of the Transpolar drifts have been reconstructed by correlating radiocarbon dates with species identifications and relative abundance, beach ridge chronologies, and fast-ice conditions along coastal areas (Hellmann et al. 2013)

Southward, along the Nunavik and Labrador coasts, most of the wood originates along the spruce- and tamarack-forested rivers such as the Thelon that empties into southwestern Hudson Bay (Parker et al. 1983). Logs then follow a clockwise current toward the northwestern tip of Nunavik before following Hudson Strait to the Labrador coast (Laeyendecker 1993). Driftwood encountered along this coast is usually small (6 to 9 cm in diameter and smaller), includes spruce, larch, alder, willows, and birch, and is mostly of North American origin (Fitzhugh et al. 2006).

WOOD AS FUEL IN THE ARCTIC

Fuel for fires is among the better-known wood use in archaeological contexts, since charcoal is generally better preserved than noncharred wood. In the North, animal fat and bone were in some cases also used either as primary fuel or as supplements (Burch 2006; Jenness 1922). Charcoal analyses in Arctic and Subarctic contexts are rare, and the only in-depth diachronic analysis of fuel use in a Subarctic environment is Deo Shaw's work on the 7500-year-old Kodiak Island cultural sequence in the North Pacific (Deo Shaw 2012).

Early Use of Firewood: The Interior Subarctic

Information about the fuel used by pioneering human groups in Beringia is sparse. Paradoxically, the type and availability of fuel are often presented as obstacles or incentives to early colonization of Eastern Beringia. Vegetation changes during the late

Pleistocene and early Holocene, especially an increase in birch shrubs, would have provided a more accessible fuel resource, consequently allowing a larger influx of people into the interior valleys (Mason et al. 2001). Systematic analyses of fuel, however, do not exist for these early sites, except for recent work at Swan Point, where only a few charcoal fragments were found (Crass et al. 2011). In cultural zone 4 (CZ4), the hearths are “identified by concentrations of burned bones, carbonized residue and soot-stained artifacts.” (Holmes 2011:183). The lack of charcoal in the earliest levels (ca. 14,000 cal B.P.) versus the presence of many burnt bones and greasy stains in the loess deposit led Crass et al. (2011) to successfully experimentally fuel hearths with bone, grass, and dung. While animal fat, fresh bones, and dung may have been the fuel resources for the inhabitants of Swan Point, occasional charcoal fragments of *Salix* sp. and/or *Populus* sp. have been identified, even if “rarely associated with hearths” (Holmes 2011:183). Two of these willow charcoals from CZ4 have been radiocarbon dated to $11,660 \pm 60$ ^{14}C B.P. (Beta-71372) and $11,660 \pm 70$ ^{14}C B.P. (Beta-56667).

Mason et al. (2001) remark that while most charcoal fragments from early Beringian contexts remain unidentified, willow is the wood burnt during the earliest cultural phases at Onion Portage –Akmak/Kobuk phases, ca. 9500 ^{14}C B.P. This suggests well-established willow was potentially an important fuel source on the landscape. In early sites of the Alaskan Brooks Range (ca. 11,000 B.P.), a few charcoal fragments are identified as willow and shrubs of the betulaceae family (Rasic 2011). Further east in the Tanana valley, at the Upward Sun River site (Potter et al. 2011), *Salix* sp. is again associated with the earliest component dated to ca. 11 300 ^{14}C B.P. and charcoals of willow, poplar, and probable Service berry (*Amelanchier* sp.) are found in the slightly younger features dated to between $10,180 \pm 50$ ^{14}C B.P. and 9290 ± 50 ^{14}C B.P. Two of the long fragments of charred wood found in direct association with the cremation pits of a young child were identified as *Populus* sp. (Potter et al. 2011). This reinforces the data from pollen studies that show occasional *Populus* present on the landscape at this time (Bigelow 2007). Future analysis of charcoal fragments from this pit and related activity areas should offer unique insight into function-specific fire pit and ancient practices of cremation.

The site of Onion Portage on the Kobuk River provides a 9,000-year record of fuel use based on charcoal preserved and collected in clusters and hearths found in spatial and stratigraphic contexts (Anderson 1988). Alix (unpublished data) identified about 2,100 charcoal fragments from 105 samples collected within levels of bands 4 to 8 relating to the Arctic Small Tool tradition (ASTt), Northern Archaic (NA), and Paleoarctic traditions. Willow is the most abundantly identified species in the earliest levels (band 8 and below), while taxa of the betulaceae family (mostly *Betula* sp.) account for 10 percent and poplar for 5 percent. Willow is present throughout this 4,000-year record. It is somewhat occasional during the NA tradition (5–9 percent of total) when spruce predominates (50–70 percent). Spruce starts to grow in the area and becomes available as driftwood no earlier than in band 6 (after 5500 ^{14}C B.P.). Willow becomes widely used again during the ASTt (bands 4 and 5, level 1) where it constitutes 30–40 percent of all fragments identified. The differences between ASTt and NA firewood cannot be explained by change in the vegetation, but suggest instead differential fuel preferences

or activities, which might be explained by ASTt adaptation to tundra, where willow is often a favored fuel.

Later Use of Wood as Fuel: The Coastal Arctic

The scarcity of driftwood led to its rare use as primary fuel. Oil and blubber were remarkable substitutes, burnt in well-designed and efficient stone and earthen lamps or directly in hearths (Odgaard 2003). However, while the lamp is a prominent item of Arctic life, open fires inside winter houses, with or without the use of lamps, and in summer dwellings, are found throughout the full span of regional prehistory. In the west, willow was historically selected when driftwood was unavailable (Stefánsson 1919). In the central Arctic on the other hand, historic Inuit preferentially used heather (*Cassiope tetragona*) as their most common summer fuel, burnt in small fires fed slowly, “a handful at a time, keeping the blaze uniform” (Stefánsson 1919:46). Blubber was usually kept for the coldest months (Jenness 1946). This particular use of fuel can be seen as an adaptation to the scarcity of driftwood or willow in these regions. However, it was so strongly anchored that when willow was available, preference still went for heather (Stefánsson 1919). In even poorer areas where heather was unavailable, the much less desirable mountain aven (*Dryas integrifolia*), locally called *okauyak*, was used (Jenness 1922). Jenness also reports on strong restrictions among Copper Inuit, such as the interdiction to burn driftwood to cook terrestrial meat and lake or river fish. Similarly, cooking seal meat on a cottonwood fire was avoided because “it would cause the weather to become very cold” (Jenness 1922:98–99).

The earliest archaeological sites in the eastern Arctic are characterized by axial features with a box-like hearth often associated with fire-cracked rocks (Grønnow and Jensen 2003). Experiments show that these box hearths, fueled with sea-mammal and muskox bone and wood, were extremely economical, produced little smoke, and functioned like a lamp (Odgaard 2003). In western Greenland, Saqqaq people first settled in areas with sufficient driftwood resources to sustain their need (Grønnow 1996; Møbjerg 1999). Recent data on mid-Holocene driftwood supports this assumption (Funder et al. 2011). However, heating water and food with fired rocks demands a considerable fuel supply (Odgaard 2003). By the late Saqqaq period, soapstone lamps and vessels were introduced and fire-cracked rocks became rare. Møbjerg (1999) suggests that decreasing driftwood supplies led Saqqaq people to develop the lamp. Unfortunately, while the performance of the box-hearths has been well tested, their content and the charcoal types burnt with other fuel are not known specifically. Consequently, no information exists on the ratio of shrub, driftwood, bone, and blubber or on changes through time. In northern Greenland, data on firewood used by Independence I people are limited to Knuth 1950s’ survey and the rare instances where he specifies finding willow together with bones (Grønnow and Jensen 2003). In the western Arctic, Paleoeskimo firewood is also poorly known, except for recent work at Onion Portage (see above). Open fireplaces are found parallel to stone lamps in Choris and Norton cultural complexes and later in

Neoeskimo cultures. One good firewood dataset is the uniquely informative analysis of Pre-Dorset charcoals from Umingmak on Victoria Island (3600 B.P.), where willow twigs from shrubs that today grow primarily on hilltops were predominantly identified in hearths—895 willow fragments out of 896 analyzed (Schweingruber 1977).

During the first millennium A.D., the Ipiutak culture distances itself from its Norton predecessor and Neoeskimo contemporaries (Old Bering Sea [OBS] or Okvik, Birnirk, Early Punuk) by seemingly not using the lamp. Ipiutak houses have a large open hearth in the middle of the floor, averaging 75 cm in diameter and up to 2.2×1.8 m in the large qargi at Deering (Larsen 2001). At Point Hope, these fireplaces are described as “round or oval heap(s) of hard-burned ash situated in the east-west axis of the house . . . the consistency of the ash seemed to indicate that blubber and possibly bone were burnt together with wood” (Larsen and Rainey 1948:189). The dimension and depth of these hearths have led archaeologists like Mason to emphasize the Ipiutak “voracious appetite for wood” (Mason 2006:110). Unfortunately, their contents have not been systematically analyzed and nothing is known about fuel types and ratios.

During the Neoeskimo tradition, the general understanding is that most groups used lamps for heat and light (of pottery in the west and soapstone in the east), and hardly burnt wood. Winter houses were semisubterranean, with a long entrance tunnel, rear sleeping platform, and at least one lamp stand. However, evidence of fires is not uncommon, especially in the west, either in the form of fireplaces or, indirectly, from observation of pottery sherds with “heavily encrusted soot,” described as “doubtless, from extensive use in the fire” (Ford 1959:201–204). On St Lawrence Island, Collins (1937) reports hearths in an OBS and Okvik house and, at Cape Krusenstern, a Birnirk house (Fea. 32) has a hearth in the middle of its floor (Giddings and Anderson 1986). In Norton and Kotzebue Sound, evidences of internal or external fires are even more common (Giddings and Anderson 1986). However, they “averaged considerably smaller than in river houses” of the Kobuk River (Giddings 1952b:102) where evidence of wood burning is important and the supply of driftwood and dead standing wood is incomparably greater. Oswalt (1955:41) considered that in Alaska “most coastal groups had driftwood enough for fireplaces in the houses and/or out-of-doors cooking fires.” In his view, the availability of fuel had little impact on the quality of pottery making for example, but this opinion is not unanimous (Anderson et al 2011; Giddings 1952b).

Two phases of the Thule culture (western Thule and Ruin Island) are characterized by kitchens found in external areas, annexes or alcoves, and usually described as thick and black burnt layers (Morrison 2009). Their occurrence has been used to follow the migration of Thule pioneer across the Canadian Arctic. These burnt areas or kitchens with or without direct access to the main living spaces (Giddings and Anderson 1986; Morrison 2009) raise questions about the season of occupation of these sod houses. In the Mackenzie Delta, they have been reported as dwellings used also in summer with a central fireplace (Nagy 1994). The few charcoal analyses of Thule contexts show that driftwood and local shrubs were burnt and, like in Ipiutak hearths, bone and blubber were added to the fire. However, the question of availability and cost-effectiveness of wood and other fuel sources should be explored systematically, especially in relation to

specific activities such as ceramic production, cooking, and food preparation, and the practice of taking heat baths, a tradition that was widespread in southwestern Alaska and most probably existed further north and back in time. Ultimately, this will lead to discussing the economic status of firewood and its cultural value.

WOOD FOR BUILDING AND SMALL CARPENTRY

Woodchips, the remains of woodworking activities, are numerous wherever wood was worked. In northern archaeological deposits, they often have been left frozen through time. Woodchips are mentioned in creation stories on both sides of Bering Strait and as far east as Nunavik. In a story from Chukotka, a raven whittles wood chips to create the animals on the land (Bogoras 1904–1909); in another, wood chips are said to be the origin of Alaskans. Thrown in the sea by a lonely old Chukchi man working on a sled, the chips came back as people speaking a different language (Van Deusen 1999). In yet another story from Alaska, a man sits by the river, “whittles away at pieces of wood,” the chips fall in the river, and when they reach the sea, they turn into different species of fish (Millman 1987:38). A variant of this story from Nunavik tells about “a man who was cutting down a tree, observed that the chips continued in motion as they fell from the blows. Those that fell in the water became the inhabitants of the water. Those that fell on the land became the various animals” (Turner 1894:261). While wood is not often considered as a major raw material used by Arctic people, these stories remind us that it played a critical role not only in daily activities but also in people’s intellectual representations and social life.

Historical and ethnoarchaeological research shows indeed that wood was an essential part of Inuit society. Detailed terminology related to wood and carpentry reflects a long tradition of Inuit woodworking which is deeply rooted in traditional knowledge going back at least 2,000 years. Despite the relatively low tree taxa diversity in driftwood accumulations, and the predominant use of only one or two, the Eskimo-Aleut languages contain a variety of terms for different wood types (Fortescue et al. 1994). Wood is described and named according to where it comes from within the tree but also according to its physical characteristics and related mechanical qualities. Spruce trees produce woods with differential hardness, flexibility, ease of splitting, and straightness that are given different names, each being kept for specific tasks or implements. This classification is found throughout the Arctic from southwestern Alaska to Greenland, and some terms have a common etymology.

Wood was a major building material especially in the western Arctic and Alaska (Figure 4.2), and was crucial for the frame of sod houses, as shown by the many houses excavated and dating to the last 3,000 to 2,000 years. Frame elements and planks for floors and plate-forms were split with wedges, hewn and adzed down from large logs. Straight poles, possibly saplings, were kept for summer tent poles and trips to



FIGURE 4.2 Birnirk or Early western Thule house frame, Cape Espenberg, August 2011.

Photograph by Claire Alix

the forest edge organized for their procurement. These poles were precious kept, transported and reused (Jenness 1922) and thus are rarely found archaeologically. As reported by Mason (1998: 290), “while houses probably lasted a generation without significant modification, a single house required a portion of up to 20 trees for walls, and a sizable number of other structural members.” Large structures such as the Deering Ipiutak qargi made use of a great number of very large logs (up to 40 cm in diameter and 12 m long) and the time spent collecting the necessary timbers for such a structure either stretched over several years or was the result of exceptional wood arrival events.

Further east, where wood is scarcer, other materials were used predominantly, such as slabs of rocks, boulders, and whale bone. The long mandibles and jawbones of the bow-head whales were the best substitute for wood in terms of length, strength and mechanical properties, not to mention the added spiritual value of the whale.

Early Woodworking in the Arctic

Good preservation of wood remains is more rare in sites older than 1,500 years. Where preserved, they overwhelm the record and show the antiquity of well-mastered wood

technology (Grønnow 1994; Jordan 1980; Pitulko and Kasparov 1996). Zhokhov Island by 76° N is the oldest known northern site (ca. 8000 B.P.), with remarkable wood preservation (Pitulko and Kasparov 1996). Split driftwood elements are interpreted as the structural frame of cone-shaped buried houses and compared to “golomo”-type dwellings from the Taimyr Peninsula. Fragments of larch and spruce were identified among a small sample of unmodified wood collected by Daniel Odess. No detailed woodworking analysis has been published but partially ground adze blades, potential antler handles, and sandstone abraders are reported. The assemblage shows also a large array of well-formed wooden utensils, tools, and weapons, and a near-complete sled runner, indicating the antiquity of sleds in the North (Pitulko and Kasparov 1996). Nevertheless, the timing of the origin of dog traction remains unresolved (Sheppard 2004). In the American Arctic, the oldest identified sled runners are 1600 years. Found at Nuvuk, northern Alaska, these complete and long runners are carved out of whole spruce logs with integrated stanchion pieces and thinned recurved ends.

Paleoeskimo Woodworking

Early Paleoeskimo wood technology is known from Qeqertasussuk, a thick frozen midden in west Greenland dated between 3,900 and 3,100 radiocarbon years ago. The artifact assemblage shows that the first inhabitants of western Greenland had a fully Arctic-adapted toolkit in which wood held a central role (Grønnow 1996). Shafts have a wide range of diameters, which Grønnow relates to different types of arrows, leisters, and darts or harpoons, and in turn to specific hunting techniques. Some wood elements are also interpreted as kayak ribs and hunting bow fragments. When Saqqaq people settled in Disko Bay, the area had been previously unoccupied and driftwood is thought to have been plentiful (Grønnow 1996). However, even if wood had been accumulating since early postglacial, all of it might not have been suitable for carpentry. Wood decays once stranded, even under the somewhat dry climate conditions of Disko Bay. Oral history work among south central Alaskan Yupik recorded the tendency carvers have to choose fresher and sounder wood for carpentry (Alix 2007). In western Greenland, Saqqaq craftsmen selected at least seven taxa ($n = 370$ analyzed fragments): *Picea* sp. (51 percent), *Larix* sp. (35.5 percent), *Juniperus* sp. (~5 percent), *Pinus* sp. (~4.5 percent), *Abies* sp. (~0.7 percent), *Salix* sp. (~3 percent), and *Populus* sp. (~1.2 percent) (Grønnow 1996). Both *Pinus* sec. *sylvestris* and *P. sec. strobus* were identified (Grønnow, personal communication 2001). All taxa, other than juniper, have been reported in Arctic driftwood, specifically in southern Greenland, even if fir and both types of pines are less common (Eggertsson 1994). Juniper grows in southern Greenland today. Tools used for woodworking include large and small wedges made of whale bone and caribou antler, adze blades made of gray silicified slate, a series of knives, scrapers, and chisels made also of killiaq and pumice stones for abraders (Grønnow 1996). Finally, techniques such as fire scorching, wood bending, and precise scarf joints are reported, and Grønnow (1996) refers to the Saqqaq as experts in lashing.

No equivalent site of this time period exists in the western Arctic. Denbigh sites with organic preservation are rare and only a few contain bones (Tremayne 2011). However, most sites contain adze blades of silicified slate or basalt indicating woodworking activities (Dumond 1987). It is only with Ipiutak assemblages (ca. A.D. 200–900) that sites such as the Deering qargi in Kotzebue Sound (Larsen 2001) contain wood remains as well preserved as those of Qeqertasussuk. More recently a similar but smaller structure was found at Qitchauvik, in Norton Sound (Mason et al. 2007), and a partly eroded and ill-defined feature at Nuvuk, northern Alaska, produced a large assemblage of mixed worked wood and natural drift. Analyses show that while Ipiutak people may have been hungry for firewood (Mason 2006), they certainly were master carpenters. Their dependence on wood for tools stands out as being greater than that of later Thule culture. Ipiutak carpenters selected straight-grain, knotless wood from lower spruce trunks to make shafts, slats, and other instruments that were worked with multiple wedges, and a wide range of chisels and adzes (Larsen 2001). Some of the cut marks suggest the use of an iron knife while others are the result of gouging with beaver teeth. Confirmation awaits experiments.

In the eastern Arctic, excellent wood preservation occurs in several Dorset sites located (1) around Baffin Bay in northern Baffin Island (Nunguvik and Saatut) and in the Thule district (Qeqertaaraq, David site, and Qallunatalik/Polaris); (2) in southern Baffin Island (Willows Island) and sites in the Tanfield valley (Sutherland 2009), that include the Morrison site where wooden structural elements were uncovered; and (3) Avayalik at the northern tip of Labrador (Fitzhugh et al. 2006). These sites and their assemblages are related to Early, Middle, and Late Dorset periods (2500–500 B.P.). The excellent preservation and the number of wood carvings and masks led Mary-Rousselière (1976:54) to state that “wooden carvings were made from the earliest period of the Dorset culture” and that woodworking tradition and carving “was not a phenomenon restricted to Button Point, but a widespread tradition in the Dorset culture.” This is no surprise when one sees the refined wood technology of Saqqaq people. At the Middle Dorset site of Avayalik, 400 km north of the tree line, a ratio of wood to bone or ivory of six to one shows that when wood was available, it was the most used raw material. Mary-Rousselière (2002) made a similar observation at Nunguvik in the Dorset dwelling N73.

Wood specialist Laeyendecker identified large numbers of artifacts and modified wood fragments from these Early, Middle, and Late Dorset contexts (Fitzhugh et al. 2006). Like their predecessors, Dorset people used primarily spruce, larch, and willow, and occasionally pine (both types), fir, alder, and birch. At Willows Island, analysis shows a sharp decrease in the ratio of larch to spruce between the early and middle Dorset period, from two-thirds of spruce and one-third of larch down to less than one-sixth of larch. Laeyendecker proposes three potential explanations: (1) the effect of potential changes in the trajectory of the Transpolar Drift as described by Dyke et al. (1997), which would have brought less larch (or more spruce) to the area; (2) an overuse of larch by the early Dorset who seemed to selectively choose this wood for objects such as shafts and handles (Eggertsson and Laeyendecker 1995); and (3) differential preferences between early and middle Dorset groups. However, Laeyendecker recommends

additional and more systematic analyses to explore further the significance of her results.

Wood analyses from the Middle Dorset levels at Avayalik are not easily compared to those of Willows Island because the sampling methods between the two studies differed. No clear pattern of preferential selection can be shown except that willow predominates the wood debitage and spruce the artifacts. Fitzhugh et al. (2006:169) describe bifacial grooving for making square or rectangular holes, and “abundant evidence of scarf joints,” one of which “had a locking step-notch to help strengthen the splice” (Fitzhugh et al. 2006:169). These techniques are reported in contemporaneous Ipiutak assemblages and are considered to be within the range of techniques known and mastered by Paleoeskimo carvers.

Other interpretations have been offered to explain this abundance of Dorset wood remains. Sutherland (2009) considers some of the objects unusual, outside the range of known Paleoeskimo woodworking techniques, and resulting from Norse-European influence. Sutherland (2000) reports techniques such as “sawing, precise scarfing, the use of nails and of mortice and tenon joints,” but does not provide detailed description, except for “thin rectangular wooden pieces with a groove or step across one face, similar to staves from small containers” (Sutherland 2009:287). As presented above, techniques such as “precise scarfing” are typical of Saqqaq and Ipiutak cultures (Grønnow 1996; Mason et al. 2007), and “mortice and tenon joints” are also found in contemporaneous Ipiutak assemblages (Larsen 2001). “Sawing” on the other hand is not a technique found in ancient Arctic woodwork and its presence would be indeed “unusual.” In fact, it appears to have been rare even in early medieval northern Europe and Norse contexts (Morris 1982). Dorset artifacts showing signs of sawing need to be fully described, analyzed, and radiocarbon dated. While Late Dorset people most likely met Greenlandic Norse, it is unlikely that Dorset people owe their woodworking skills to these newcomers. Woodworking in the Arctic is ancient and rooted in a long tradition of use throughout the circumpolar North from its earliest occupation. It was fully mastered when Early Paleoeskimo people reached the eastern Arctic by 4000 B.P. and included a range of typical woodworking techniques. Dorset woodworking technology should not be seen as due to a technological transfer from “better equipped” Europeans unless demonstrated by a systematic technological analysis that would go beyond morphological resemblances alone.

Possible Norse Impacts on Wood Availability in the Eastern Arctic

According to Icelandic Sagas, the Norse who settled in southern Greenland made regular trips to Markland to acquire timber, and also brought European wood by way of Iceland. Researchers do not agree about the frequency of these trips across Davis Strait (Seaver 2000; cf. Arneborg 2000). Analyses of Norse wood remains show carpenters using mostly coniferous driftwood (spruce and larch) or wood salvaged from ships, and

more occasionally local shrubs, *Betula* sp., *Juniperus* sp., and *Salix* sp. Imported species are also present, especially in the north Atlantic islands (Arneborg 2000; Laeyendecker 1993). Taxa identified are similar to those found at Saqqaq, Dorset, and Thule sites (Alix 2009; Fitzhugh et al. 2006; Grønnow 1996; Laeyendecker 1993). However, no systematic analysis of the Greenlandic Norse assemblage has been published. Seaver (2000) has argued that driftwood in southern Greenland lacked the required quality for local shipbuilding and that trips to Markland were a necessity. In this context, only analyses combining wood identification, dendrochronology, and geochemical sourcing could potentially solve this question of wood provenance in Davis Strait and Baffin Bay between A.D. 500 and 1500. This being said, it is true that pine (particularly scotch pine, *Pinus sylvestris*) was a premium wood for shipbuilding in Europe and that white pine (*Pinus strobus*), which cannot be anatomically distinguished from *Pinus cembra* (a species occasionally found in driftwood accumulations), grows in Newfoundland and further south in Vinland. Furthermore, white pine was identified as the wood of two thirteenth-century A.D. artifacts from Nunguvik (N73) with square iron nail holes (Mary-Rousselière 2002; Park 2008; Sutherland 2009). Sutherland (2009:289) also reports fragments of beech (*Fagus* sp.) from Dorset sites, unfortunately with no associated dates or description. It was also suggested that the abundant wood of the thirteenth century Skraeling Island Thule site off eastern Ellesmere Island agreed well with the interpretation of a Norse shipwreck from which materials had been recycled (Schledermann and McCullough 1980). Finally, occasional oak fragments are reported once the Norse are present: one charcoal fragment at Skraeling Island (McCullough 1989); another (out of 30 kg of analyzed fragments) at the Norse V51 Sandness site in Greenland (Laeyendecker 1993, 162); and a piece “inserted in the gunwale” of a fifteenth-century umiaq found in Peary Land (Gulløv 2008, 19).

Considering the need and desire for wood of the three protagonists present in the eastern Arctic during the early second millennium A.D., it is surprising that this important question, which relates to timing, origin of wood supplies, and technological skills, has not been tackled more systematically.

Thule Woodworking

Recently, Fitzhugh et al. (2006) compared Paleo- and Neoeskimo wood technology and posed the following question: “if wood was as important in the Palaeoeskimo tradition, and in early cultures of the Bering Sea and Arctic Russia, why did this technology decline in the Neo-eskimo tradition?” The argument then attributes this suggested shift toward a more developed bone technology and associated *decline* in wood technology to the “increased access to metal—especially iron—both through Siberian trade and contact with Greenland for meteoric, telluric and Norse sources” (Fitzhugh et al. 2006:172).

Wood use and woodworking have been relatively stable throughout the Thule period, with changes mostly attributable to differential wood availability and accessibility, as Thule migrants settled in the east (Alix 2009). Thus, it is difficult to attribute

these changes to a “technological decline.” The introduction of iron tools would have improved more than degraded the quality of Thule craftsmanship, or at least sped woodworking activities. A detailed analysis of the importance of iron tools in Thule woodworking awaits, but preliminary observations suggest metal tools were probably in more extensive use than reported. Iron hatchets were, after all, among the most wanted trade items when early explorers met northwestern Alaskan Inupiat (Bockstoce 2009). In dwellings of Cape Espenberg in northwestern Alaska (twelfth to seventeenth centuries), cut marks on wood from most contexts show the use of sharp blades, which suggest iron. The high quality of Thule carpentry is also expressed in the long and precise scarf joints of Early Thule hunting-bow fragments, especially visible at Nelson River (Arnold 1994). Technologically opposing bone and wood raw material in a “decline-versus-climax” relationship is probably unnecessary. Tools for wood and bone working are often similar and have been used interchangeably. While the tools are interchangeable, the use of wood and bone material is not necessarily so. Beyond questions of the dimension and weight of the raw materials, the hardness and durability or resistance to wear seem to have had more to do with selecting wood over bone or vice versa when a choice was possible. Stefánsson (1921:360) reports that following the shipwreck of the *Investigator* in northern Banks Island, the Copper Inuit were salvaging raw materials and keeping the barrel hoops made of softwood (i.e., coniferous wood) and not the staves made of hardwood (i.e., deciduous, probably oak). When asked about it, “They explained that the hard wood was almost as difficult to make anything out of as caribou antlers and not nearly so durable. In other words, they saw no use for hard wood except to replace bone or horn, and bone or horn was better than hard wood.”

CONCLUSION

Wood remains are a special challenge in the archaeological record. When absent, the tendency is to forget wood ever was important and used. When preserved, it quickly overwhelms the archaeologist who wishes it had never existed. In the Arctic, the challenge is even greater because of fieldwork logistics and because the occurrence of wood not only varied due to changes in vegetation, but also due to large-scale environmental factors related to global ocean and atmospheric circulation. A complete understanding of the variables at play, environmentally and culturally, is thus necessary to fully understand the role of wood in past Arctic societies.

The other tendency in the Arctic is to consider driftwood as a lesser-quality resource than forest timber. In fact, research shows that wherever driftwood came to shore it was most highly appreciated. Throughout the Pacific, it has been seen as a gift from the gods (Lepofsky et al. 2003). This feeling is somewhat shared along driftwood-producing rivers of Alaska and along the coasts of southwestern Alaska, where Yupik chanted and called on the driftwood spirit for loads of logs to return every spring.

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CHAPTER 5

ARCHAEOLOGICAL EVIDENCE FOR TRANSPORT, TRADE, AND EXCHANGE IN THE NORTH AMERICAN ARCTIC

JEFFREY T. RASIC

INTRODUCTION

A wide variety of raw materials, manufactured goods, and food circulated within and between prehistoric communities in the North American Arctic. These included perishable raw materials such as fish and seal-mammal oil, dried meat and fish, skins and furs, walrus ivory, wood, and durable rocks and minerals such as nephrite jade, soapstone, chert, obsidian, slate, graphite, pyrite, galena, jet, lignite coal, amber, quartz crystal, and hematite (Ball 1941; Birket-Smith 1929a, 1929b, Burch 2005, 2006). These materials were not only means for survival and nourishment, but their exchange constituted the cement by which social bonds, economic relationships, and political alliances were created and sustained.

Transportation and exchange, and in turn the social, economic, and political context within which they took place can be revealed, in part, through archaeological provenance studies, whereby the raw materials used to make artifacts are identified and connected to their place of origin. Materials most valuable for provenance studies are durable ones that are preserved in archaeological contexts. It is also desirable that the materials derive from a limited number of discrete sources, are visible within an archaeological collection as something out of the ordinary, and are materials with unique composition or petrographic character that allow archaeological specimens to be correlated with materials from specific source areas. Although such rare or exotic materials are a small portion of all the goods circulated in ancient Arctic exchange systems, they nonetheless can serve as valuable tracers that shed light on the operation of the system as a

whole, and the changing geographic scale and orientation of exchange networks and land use over time.

A wide range of techniques have been developed to identify the composition and other unique characteristics of archaeological materials for provenance purposes. Approaches employed in the Arctic are the same as those used in any region and include characterization of trace-element geochemistry, petrographic attributes, stable isotope values, visual appearance, and geochronology. A prerequisite for fruitful provenance research is good knowledge of the possible sources for a given material and a comprehensive catalog of source signatures. On both accounts provenance research in the Arctic is in a formative stage at best. The region is vast, access is costly, and the geological mapping needed to understand the likely distribution of rocks and mineral raw materials often exists only at a coarse scale. For many kinds of raw materials used in the past the large majority of sources remain unknown to modern geologists and archaeologists. This is at once a challenge to archaeological provenance studies, but also testament to the deep knowledge of geological resources and raw-material sources that the first residents of the Arctic possessed.

From an archaeological perspective it is often difficult to distinguish between the movement of materials through mechanisms of formal vs. informal exchange or from direct and indirect procurement by individual members of a mobile population so no attempt is made here to do so. Instead, and given the formative stage of provenance research in the Arctic, this chapter describes the gross-scale raw-material landscape for the most important rare and exotic materials for which distant transport can be recognized and which were likely to have been objects of exchange in prehistory: nephrite jade, soapstone, chert, and obsidian. It is a first attempt at a broad framework for provenance research across the North American Arctic that highlights materials with potential use in provenance studies.

The geographic coverage extends across the North American arctic from Norton Sound in western Alaska to Labrador in eastern Canada, subdivided into *western* (Alaska to the Mackenzie River), *central* (Canadian Arctic archipelago and Arctic coast to Hudson Strait), and *eastern* (Northern Quebec and Labrador) zones (Figure 5.1). For each material an overview is provided that touches on precontact uses of the material, geological source locations, patterns of distribution over time and across space in archaeological contexts, and the prospects for and status of provenance studies.

CULTURAL AND GEOGRAPHIC CONTEXT

Ethnographic accounts demonstrate the richness and complexity of exchange systems in the North American Arctic and their vital importance to cultural and economic life. A Kuuvangmiit Iñupiat elder from the interior northwestern Alaska village of Shungnak, for example, recounted his extensive travels in the early twentieth century that ranged from the Chukchi Sea throughout the Brooks Range, north to the Arctic Slope, and south to Athapaskan territory on the Koyukuk River. Most of these journeys involved trade, even

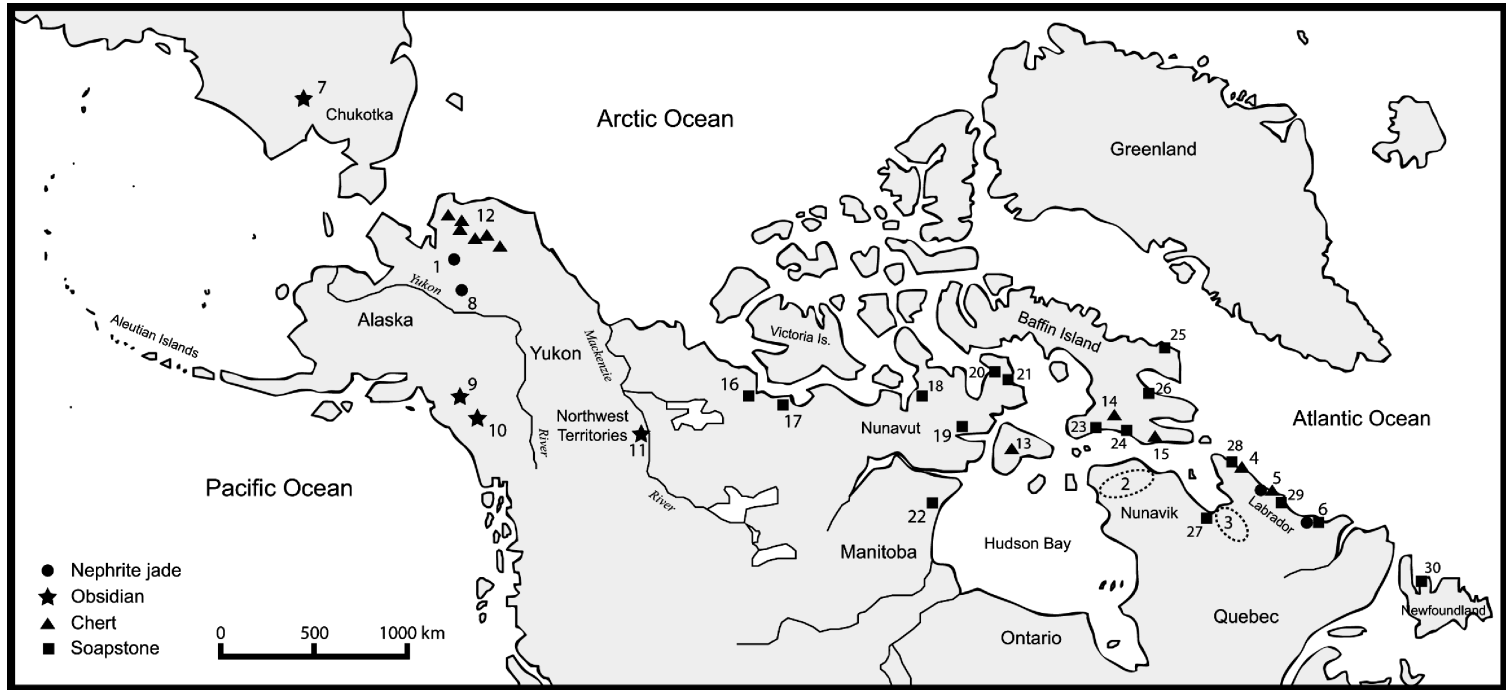


FIGURE 5.1 Sources of selected lithic raw materials in the North American Arctic. Nephrite Jade: (1) Kobuk River; (2) Cape Smyth-Wakeham Bay; (3) Labrador Trough; (4) Ramah Formation; (5) Mugford Formation; (6) Hopedale Formation. Obsidian: (7) Krasnoye Lake; (8) Batza Téna; (9) Wiki Peak; (10) Hoodoo Mountain; (11) Tertiary Hills Welded Tuff. Chert: (4) Ramah Bay; (5) Mugford Formation; (12) Brooks Range; (13) Southampton Island; (14) Mingo and Amadjuak Lakes; (15) Baffin Island. Soapstone: (16) Rae River; (17) Tree River; (18) Murchison River; (19) Ukkusiksalik; (20) Kingora; (21) Ajaqutalik; (22) Rankin Inlet; (23) Kangiqsuqtaq; (24) Tatsituya (Aberdeen Bay); (25) Qikiqtarjuaq; (26) Opingivik; (27) Kaksoak River; (6) Hopedale; (28) Nachvak Fiord; (29) Okak; (30) Fleur de Lys.

Map drafted by J. Rasic

when trade was not the primary purpose of a trip. Before traveling to the regional center, Kotzebue, he built up a stock of wolf, wolverine, and fox pelts, which he exchanged for seal oil, maktak, and sealskin. Before returning home he always spent time socializing, and on one trading journey he met the woman who became his wife (Anderson et al. 1977:243).

This vignette parallels numerous ethnographic accounts (e.g., Birket-Smith 1929a:150; Burch 2005; Spencer 1959) and illustrates several key, and likely long-lived, aspects of travel and exchange in the Arctic. For one, trade was vital. Burch (2005), for example, characterized its role in historic period Iñupiat culture in northwestern Alaska as an unqualified obsession, an activity so important that for the sake of trade people would meet peacefully with their most hated enemies at annual trade fairs. Second, the scale of travel and geographic knowledge was extensive. In this example, some 180,000 km² were traversed in a lifetime—an area the size of the state of Washington—and all by foot, snowshoe, or skin boat. Third, exchange was firmly embedded within a suite of other activities that included hunting, fishing, and collecting of raw materials, and not insignificantly, socializing. Indeed, one trading journey from Shungnak led to marriage and a lifelong partnership of the most valuable sort. Traveling, trading, and social interaction were thus closely linked. People interacted to exchange things, but likewise exchanged things in order to interact.

The physical geography of the Arctic influenced patterns of exchange in fundamental ways as well. Its long coastline is intersected periodically by rivers that flow from inland tundra and mountain settings and thereby connect areas with diverse resource bases, the most fundamental contrast being that between marine and terrestrial environments (Rowley-Conwy 1999). Waterways served as important paths for travel, communication, and exchange over an extensive area with a diversity of resources, and webs of overland routes cross-cut many inland zones. In the last 1,000 years, and probably for millennia earlier, the use of sleds and large skin boats (umiat) had a substantial impact on the nature of travel, interaction, and exchange, since it made feasible long-distance and relatively rapid transport of people and considerable volumes of goods (Friesen 2012).

Exchange of marine resources for those available in interior environments was a fundamental aspect of traditional trade in the Arctic and was also the critical means to cope with seasonal and spatial variations in subsistence resources. A driving concern of inland groups was obtaining calorie-rich sea-mammal products from the coast (Anderson et al. 1977). Inland groups often provided, in return, durable raw materials from the mountainous interior. Campbell (2004), for example, describes how the inland (Nunamiut) Iñupiat of the central Brooks Range interacted with Arctic coastal Iñupiat. In return for marine products they exchanged a variety of land-animal skins, sandstone for oil lamps, and chert for knives, ulus, and spearheads, and also served as middlemen to inland (Koyukon Athapaskan) groups with access to obsidian used for cutting bone, horn, and hair.

These patterns were very likely in place for the past 1,000 years across most of the North American Arctic, but our knowledge of the extent to which these patterns extended into the more ancient past relies entirely on archaeological data and has not been well researched. Understanding the patterns of prehistoric exchange and movement of people begins with the identification of items from archaeological sites that can be shown to have derived from a specific place of origin, or provenance.

NEPHRITE JADE

Nephrite jade occurs in very few places in all of North America, but is found in the Arctic and was highly valued as a raw material for manufacturing stone tools. It was exchanged and transported widely in prehistory. It is also a material amenable to provenance studies, although few have been pursued in the Arctic (Blackman and Nagle 1982). Jade is a general term applied to two rocks more precisely termed as jadeite and nephrite, which both occur in metamorphic rocks, but differ in chemical composition. Jadeite is composed of sodium clinopyroxene and nephrite is a silicate of calcium and magnesium (Hung et al. 2007). Only nephrite occurs in the Arctic. It is a hard, fine-grained rock, and due to its interlocking fibrous structure, is exceptionally durable. Nephrite can have a striking appearance due to its deep colors and slightly translucent appearance that are particularly evident when polished. It can vary from a pale or bright green to a dark olive, almost black (Murdoch 1892:60; Smith 1913:154).

Ethnographic accounts describe tools of nephrite jade as valued trade materials exchanged internationally and interregionally (Burch 2006:193–194). Mathiassen (1927a:27), for example, describes nephrite jade being distributed by barter to the Inuit of the west coast of Hudson Bay and Baffin Island as early as the Thule period, and Kotzebue (1821:296) noted it had been exchanged between Alaska and Siberia for many centuries before his interactions with western Alaskan Iñupiat in the early 1800s. Because of the exceptional durability of jade, its most valued application was the manufacture of adzes, but it was also used for a variety of other tools such as hide scrapers, labrets, whetstones, knife blades, percussors, projectile tips, pendants, drill bits, lancets, burins, and chisels (Burch 1984:310, 2006:193; Giddings 1952, 1961:140; Montgomery 1999; Murdoch 1892:60; Nelson 1899:91; Rasmussen 1927:292).

Tools made of nephrite jade had high value not only because of the special technical properties and attractive appearance; in some contexts they also had evident luxury or prestige value. Nephrite jade occurs prominently in burials along with other valued objects (e.g., Larsen and Rainey 1948:Plate 90) and was used for status-conveying body ornaments such as labrets (Rasmussen 1927:292). The restricted geographic distribution of high-quality nephrite added to procurement costs and the laborious and elaborate methods required to process and shape nephrite jade (see Giddings 1967:305; Stefánsson 1919:393) contributed to its value. Objects of exchange were typically finished or near-finished tools rather than unmodified, raw nephrite (Montgomery 1999).

Western Arctic–Kobuk River source. Only one source of nephrite jade is known in the western Arctic, in interior northwestern Alaska at a series of localities along a 40-mile reach of the Kobuk River (Anderson 1945:24; Ball 1941; Cantwell 1884, Giddings 1952). Early explorers to the region, and later anthropologists, recorded important details about the distribution, procurement, and use of nephrite jade from Kuuvanmiut Iñupiat residents of the Kobuk River who still had considerable knowledge of traditional jade

use (Giddings 1967:306; Smith and Mertie 1930:345; Stoney 1900:56). Upper Kobuk River people during the latest prehistoric period (ca. 250 years ago) are described as jade-working specialists and sites in the area contain abundant workshop debris (Giddings 1967:318) indicative of production for exchange.

The nephrite jade from the Kobuk River occurs as pebbles, cobbles, and boulders in tributaries to the north of the Kobuk River, such as Jade Creek, Shungnak River, Dahl Creek, Cosmos Creek, and California Creek (Anderson 1945; Ball 1941:25–26; Murdoch 1892:60; Smith 1913:154); in lode deposits at Jade Mountain (Anderson 1945); and in thin sheets from a locality above the village of Ambler (Burch 2006:193–194). Loney and Himmelberg (1985) provide a detailed geological description of the nephrite jade deposits on the Kobuk River.

Nephrite jade occurs commonly in ethnographic collections and prehistoric archaeological contexts from Alaska. The greatest concentration of artifacts occurs in northwestern Alaska and the Bering Strait region close to the Kobuk River source, and extends to adjacent coastal areas from Norton Sound in the south to Point Barrow in the north (Emmons 1923; Nelson 1899), while a broader, thinner distribution of Kobuk River nephrite extends south to the Yukon-Kuskokwim delta in southwestern Alaska and possibly as far as the Aleutian Islands (Emmons 1923). To the east, nephrite was distributed by barter to the Inuit of the west coast of Hudson Bay and Baffin Island as early as the Thule period (Mathiassen 1927b:27). Boas (1907), likewise, describes a nephrite jade knife fragment thought to be from Alaska found within a precontact collection from Victoria Island some 1,600 km distant from the Kobuk River.

The use of nephrite appears rather late in the prehistoric sequence in the western Arctic, with the earliest archaeological occurrences in Ipiutak burial features at Point Hope (Larsen and Rainey 1948:Plate 90) dated to about A.D. 500. Nephrite becomes increasingly common in the subsequent Western Thule period and is found at sites like Iyatayet (Giddings 1967:253) and Cape Krusenstern (Giddings and Anderson 1986:103).

While the Kobuk River is the dominant and well-known source of nephrite jade in the western Arctic, there are other potential sources for archaeological nephrite found in the western Arctic. Geological sources of nephrite jade are known from the southern coast of British Columbia in the Fraser River drainage, but are not thought to have been exchanged into the Arctic, only being transported as far north and west as Bering Bay (Emmons 1923). Jade from Asian sources could also potentially occur in the North American Arctic. Emmons (1923), for example, described tools of yellow-green jade—an uncommon visual variety within the Kobuk River source area—that were reportedly brought to Nome from the Siberian coast; however, the origin of these tools has not been empirically demonstrated.

Central Canadian Arctic. In the Central Canadian Arctic nephrite jade artifacts occur in low frequencies within Paleoeskimo and Thule assemblages. While some portion of these tools seems to have derived from very distant sources, there are indications that nephrite was also procured locally (McGhee 1996:138); however, no geological sources with evident, or even likely, human use have been documented in the Central Canadian Arctic zone. One source noted in the ethnographic literature is on the Rae River in the

Coronation Gulf region (Jenness 1925:432), but no evidence of human exploitation of this source is known, nor does nephrite jade seem especially abundant in archaeological sites in the vicinity. If the source is indeed nephrite jade, it was not an important raw-material source in the past. The likely origin of nephrite in the Central Canadian Arctic is glacially deposited pebbles in a thin and diffuse distribution that almost defies the common concept of a “source.” The character of nephrite jade tools in the region—being almost exclusively small tool bits rather than the larger, well-made adze bits that were commonly exported from Alaska—suggests pieces of nephrite jade were typically acquired locally, and is consistent with the picture of thinly dispersed, small pebble sources. No attempts have yet been made to use geochemical or other provenance techniques to characterize nephrite jade artifacts from the Central Canadian Arctic region.

Eastern Canadian Arctic. The use of nephrite in the Eastern Canadian Arctic zone first appears, although rarely, in Groswater Paleoeskimo assemblages, but increased use is seen in the subsequent Dorset occupation of Labrador where it is a small, but consistent part of Dorset and Thule assemblages (Nagle 1984). Tools made of nephrite include small adzes or celts, knives, and projectile armaments. Most commonly, however, nephrite was used for small tool bits: burins or burin-like tools, and drill tips (e.g., Higdon 2008; Jordan 1980; Nagle 1984; Rowley 1940). As in the Central Canadian Arctic zone, geological sources are poorly known and are probably thin and dispersed. The single confirmed source of nephrite in eastern Canada is at Noddy Bay, Newfoundland (Nagle 1984). Sources may exist, but have not been demonstrated, in Labrador and Northern Quebec. Metamorphic rocks of the appropriate type to contain nephrite include the Cape Smith–Wakeham Bay Sills and the Labrador Trough formations in northernmost Quebec (Pearse 1975), and the Ramah, Mugford, and Hopedale formations in coastal Labrador (Blackman and Nagle 1982; Nagle 1984:158). The areas surrounding Nain and Okak, Labrador, are thought to be particularly likely to contain sources of nephrite given the common occurrence of nephrite in local archaeological assemblages (Blackman and Nagle 1982; Fitzhugh 1972; Nagle 1984:158), although no specific geological sources or quarries have yet been identified within these areas. Blackman and Nagle (1982; Nagle 1984) made initial attempts to characterize the elemental composition of nephrite archaeological samples from Labrador using neutron activation analyses, and defined four geochemically coherent groups that may in time be correlated with geological deposits.

OBSIDIAN

Obsidian is a natural glass associated with rhyolitic lavas and was a common source of flaked stone lithic raw material that was transported widely, albeit in small volume, within the western Arctic beginning in the late Pleistocene and continuing throughout the Holocene (Cook 1995; Reuther et al. 2011). None of the known or likely sources are found within the Arctic, but are instead south of the Brooks Range in the Subarctic zone.

Several thousand obsidian artifacts from sites in the western Arctic have been subject to elemental analyses, and obsidian provenance research is well developed for the region (Cook 1995; Reuther et al. 2011). Archaeologically relevant sources of obsidian are relatively few, a comprehensive catalog of source signatures exists, and correlations between artifacts and sources can be made with high confidence.

Western Arctic. Archaeological finds of obsidian are most common in interior northern Alaska in the Brooks Range mountains, and less commonly on the Arctic Slope and in northern and western coastal areas of Alaska. Obsidian artifacts occur in small numbers in the northern Yukon and follow the same patterns of use seen in Alaska.

The nearest and most important source of obsidian found in archaeological sites in the western Arctic is Batza Téna. Almost 90 percent of the obsidian found in the Arctic is from this well-known source located in the Koyukuk River drainage in subarctic interior Alaska (Clark and Clark 1993; Patton and Miller 1970). Artifacts made of Batza Téna (geochemical Group B) obsidian have been found as far north as Barrow at the Birnirk type site and near Prudhoe Bay on the Arctic Coastal Plain (Lobdell 1995). The westernmost documented occurrence of Batza Téna obsidian is from St. Lawrence Island at the Hillside site, while the easternmost occurrence is in the northern Yukon at sites in the Firth River and Porcupine River drainages (MacNeish 1956; Morlan 1973). Batza Téna is the dominant source of obsidian in all of mainland Alaska in all time periods since the late Pleistocene (Reuther et al. 2001). In Arctic Alaska it is present in the earliest dated assemblages within the region, including those assigned to Mesa (Kunz et al. 2003) and Sluiceway complexes (Rasic 2011; Smith et al. 2013, dated to ca. 13,000 cal B.P.), early Holocene age fluted point (Goebel et al. 2013), and Paleoarctic assemblages, including the Kobuk complex layers at the Onion Portage site (Anderson 1988). Batza Téna obsidian is present, and often common, in flaked stone assemblages from all subsequent time periods, including Paleoeskimo (Denbigh, Old Whaling, Choris, Norton, Ipiutak), Neoeskimo (Birnirk, Western Thule), and Athapaskan tradition complexes (Northern Archaic, Itkilik, Kavik assemblages). In late Prehistoric times Batza Téna obsidian was obtained by Iñupiat groups through trade from Koyukon Indians living in the Koyukuk River valley (Burch 2006:194).

The next most common types of obsidian seen in Alaskan archaeological sites are from sources for which locations have not been identified, yet are geochemically distinct and very likely represent individual, discrete sources. These geochemical groups include Group P, Group N, and Group G (Cook 1995; Reuther et al. 2011). Group P obsidian occurs in a few dozen sites and total specimens number only 90. Given the regional archaeological distribution, the source is likely to be found in northern interior Alaska. Sites with Group P obsidian occur in the western Brooks Range and interior northern Alaska from Cape Espenberg in the west to Mosquito Lake (central Brooks Range) in the east, south to Unalakleet, and north to Punyik Point on the north flank of the Brooks Range. The earliest use is seen in a Northern Archaic component at Onion Portage, and it also occurs in Denbigh, Choris, Norton, Ipiutak, and Thule components within the region.

A total of 90 artifacts of Group N obsidian are known from a few dozen sites, and the source is probably to be found in northern interior Alaska, given its distribution in sites from Unalakleet in the south to Tukutu Lake and Point Hope in the north. A late Prehistoric Athapaskan occupation at Rat Indian Creek, Yukon, is the easternmost example of Group N obsidian. The earliest occurrence is in Northern Archaic levels at Onion Portage. It occurs rarely in Denbigh sites, and occasionally in Choris and Norton assemblages. Its use increases in the late Holocene, where it is found in the Itkilik component at Onion Portage, a presumed Athapaskan-related complex.

Group G obsidian is known from a handful of sites in the Arctic and the total number of specimens is 42. The source location is unknown, but is likely to be in northern interior Alaska. It occurs in sites from Unalakleet in the southwest to Karupa Lake on the north edge of the Brooks Range in the north. The site of Girl's Hill located in the central Brooks Range is the easternmost occurrence. The earliest documented use in Arctic Alaska is in Northern Archaic components at Karupa Lake and the Onion Portage site. It is most common in Northern Archaic, Choris, Norton, and late Prehistoric Iñupiat (Arctic Woodland) sites, and rare in Denbigh assemblages.

Obsidian from a few other sources occurs in very low frequencies in Arctic Alaska, but are worth mention due to the exceptionally distant interactions they represent. Wiki Peak (Group A) is a well-known source of obsidian from the Wrangell Mountains in south-central Alaska (Cook 1995; Richter et al. 2000). It is the second most common "mainland" source of obsidian in Alaska but is found only rarely in the Arctic region. Obsidian artifacts from Wiki Peak appear in two far-northern locations up to 725 km from the source, and both are associated with late Prehistoric age Athapaskan occupations.

Krasnoye Lake (Group S) obsidian derives from a source in Chukotka, Russia, some 180 km up the Anadyr River, inland from the Bering Sea. Direct evidence of international exchange and travel across Bering Strait is indicated by a handful of artifacts made of Krasnoye Lake obsidian found in Alaskan archaeological sites on St. Lawrence Island and in westernmost coastal Alaska (Cook 1995). Its earliest documented appearance in Alaska is in Denbigh Paleoeskimo contexts, and continued use is seen in subsequent Norton, Ipiutak, Old Bering Sea, and Thule occupations.

Central and Eastern Canadian Arctic. Archaeological obsidian is entirely absent east of the Mackenzie River delta in the central and eastern Canadian Arctic; however, a glassy, lithic raw material referred to as Tertiary Hills Fused Tuff (Cinq-Mars 1973) occurs widely in archaeological sites throughout western Nunavut and much of Yukon Territory, including the lower reaches of the Firth, Mackenzie, and Coppermine river drainages near the Arctic coast. Rare occurrences are documented as far south as Alberta (Ives and Hardie 1983). The stone has been referred to as obsidian (Ball 1941:78; Harp 1958:231; MacNeish 1954:248), translucent fine-grained quartzite, and ignimbrite, but the location of primary source outcrops and subsequent geological investigations established the stone as fused tuff (Cinq-Mars 1973; Yorath and Cook 1981). Alternative names for this raw material have included Keele River obsidian (MacNeish 1954:248) and Keele River welded tuff (Donahue 1976). The stone is highly variable in texture and

color and the best-quality material exhibits excellent flaking properties. Two basic color groups include white-gray-black (including bluish gray) and red-brown-yellow. The material ranges from opaque to translucent, and typically exhibits a very fine sugary texture (Cinq-Mars 1973; Ives and Hardie 1983). Cinq-Mars (1973) conducted a preliminary study of the trace element geochemical composition of Tertiary Hills Fused Tuff using Instrumental Neutron Activation Analysis (INAA) and found limited chemical variation and homogeneity among source samples, which suggested good potential for provenance research.

CHERT

Chert is a hard, dense rock found in layers and nodules, generally within limestone, and is composed of microcrystalline or cryptocrystalline silica that breaks with a conchoidal fracture and has a vitreous or glassy luster (Mull 1995). It was an important raw material in precontact times across the Arctic for use in manufacturing flaked stone tools. Many sources are known from across the Arctic from Alaska to Newfoundland, although in a heterogeneous distribution. Many examples of chert tools evidence long-distance transport and suggest chert items were indeed objects of exchange. The dominant use of chert was for the production of flaked stone tools such as knives, scrapers, graters, and arrow, dart, and spear heads. Pieces of chert were also used as strikers for fire starting (Burch 2006:192), and as charms and amulets (Giddings 1956).

Western Arctic. High-quality chert is abundant in many areas along the northern flank and especially in the foothills of the central and western Brooks Range mountains. Indeed, the western Brooks Range contains what is among the largest concentrations of tool-quality chert or flint on earth. Chert is abundant and widespread in secondary, alluvial, and glacial deposits throughout the region, many of which contain tool-quality, if small, pieces of chert. Less widespread but still numerous are primary, bedrock outcrops that served as quarries and provided large pieces of high-quality stone (Mull 1995). There are probably many hundreds of bedrock quarry locations throughout the Brooks Range, but relatively few are documented. Many stone-tool workshops have been found in association with chert outcrops, indicating that the western Brooks Range was a prehistoric mining area since at least 13,000 cal B.P. (Hall and Mull 1976; Rasic 2011).

Brooks Range cherts are commonly black and gray, but include green, red, maroon, brown, and tan varieties (Malyk-Selivanova et al. 1998; Mull 1995). Color patterning ranges from homogeneous to variegated. Most cherts are opaque but a few are translucent. The framework for provenance analyses of Brooks Range cherts is sparse and the prospects for chert sourcing are daunting, since potential quarry and secondary sources are numerous, and not well documented. Likewise, many of the chert-bearing formations are distributed over extensive areas and the petrology and composition of

cherts within formations can be homogeneous across large areas. However, some distinctive chert colors can be tentatively correlated with specific rock units and the geographic distribution of these formations has been mapped at a coarse scale (Mull 1995). Preliminary provenance work on selected chert sources from the western Brooks Range was conducted by Malyk-Selivanova et al. (1998), who measured trace-element composition using neutron activation and assembled a source catalog of 12 chert varieties from nine outcrops. Extensive intraregional travel and interaction was indicated in this study, but less than 20 percent of several hundred artifacts could be correlated with a source, thus demonstrating the challenge of determining chert provenance in this region.

Central Canadian Arctic: Baffin Island, Mingo and Amadjuak Lakes. Well-documented sources of chert occur on southern Baffin Island and have been used since the initial Paleoeskimo settlement of the region (Milne et al. 2009). A large source area is found in the interior in rock formations near Nettilling, Amadjuak, and Mingo Lakes (Milne et al. 2009, 2011). The primary source of chert is a rich and widespread scatter of small nodules that carpet the local landscape (Milne et al. 2009). At least six visually distinct types of chert have been identified that include light gray, yellowish brown, white and bluish gray, white and light gray, white and light olive brown varieties, although geochemical and petrographic analyses suggest a single source group (Milne et al. 2008).

Other sources of chert in the Central Canadian Arctic include the southern end of Baffin Island in the vicinity of Hudson Strait (Sabo and Jacobs 1980), the northeastern portion of Ellesmere Island (Maxwell 1960:7), and Southampton Island (Collins 1956:68).

Eastern Canadian Arctic: Ramah Chert. The most important flaked stone lithic raw-material source in the eastern Arctic is chert from Ramah Group deposits in northern Labrador (Fitzhugh 1972; Gramly 1978; Lazenby 1980; Loring 2002; Nagle 1984; Tuck 1975). Ramah chert is remarkable for its excellent knapping quality (Rast 2008), striking appearance, massive primary outcrops, and intensive and widespread use in prehistory. The Ramah Group is about 225 km north of Nain in the Torngat Mountains and consists of a 1,700 m thick sequence of chert, volcanic flows, and diabase sills (Morgan 1975). The chert-rich unit is concentrated within a 40 km stretch of a larger, north-south trending syncline that extends from Saglek Fjord north to Nachvak Fjord (Lazenby 1980). The thickness of tool-quality Ramah chert beds can be as great as 4.5 m, and football-size boulders with only tiny imperfections are not uncommon (Lazenby 1980). Ramah Bay cirque is one especially intensively used outcrop with associated quarrying and workshop evidence. An estimated 20 to 40 million pieces of chert flaking debris cover the cirque floor at this location (Gramly 1978) and evidence the long and intensive use of this resource.

The crystalline nature of Ramah chert is unusually coarse and in hand specimens has a distinctive “sugary” appearance, although with a glassy luster (Lazenby 1980). The color of Ramah chert ranges from white, through light gray, blue-gray, and to dark gray, often mottled with bands of black, and it can be translucent and nearly colorless, in which

case it has the appearance of frosted glass (Lazenby 1980; Tuck 1975:197). Geochemical analyses have been conducted on Ramah chert (Fitzhugh 1972), but most archaeologists assign artifacts to this source based on the stone's distinct macroscopic, visual traits (Loring 2002).

Transport of Ramah chert has been demonstrated far south of Labrador to Maine and New England to distances of at least 1,500 km from its source, and perhaps as far south as Pennsylvania and Maryland, over 3,000 km from the source (Fitzhugh 1972; Gramly, 1978; Lazenby, 1980; Loring 2002; Wolff et al. 2014). To the north and west, Ramah chert has been found in Frobisher Bay on Baffin Island (Odess 1998), northernmost Quebec (Leechman 1943:366), and Southampton Island (Cox 1978:113). Ramah chert was used in all periods of prehistory in Newfoundland and Labrador, beginning with the Maritime Archaic (ca. 8000–3200 B.P.). Even earlier use of Ramah chert is indicated for the Paleoindian period (ca. 10,000 B.P.) by a Ramah chert fluted point find from Vermont (Loring 1980; Stanford and Bradley 2012:234). Pre-Dorset (Paleoeskimo) residents of Labrador made use of Ramah chert alongside other chert raw materials that were opaque and of poorer quality; however, a dramatic shift took place in the subsequent Dorset period when toolmakers emphasized the use of Ramah chert nearly to the exclusion of other flaked stone raw materials (Cox 1978:98; Gramly 1978:37; McGhee 1996:139; Tuck 1975:181–182). Loring (2002:164) suggests this occurred as a means to signal social identity among toolmakers. Some researchers have argued that the importance of Ramah chert was so great that access to it was a key factor leading to the development of extensive trade networks in the Dorset period (Loring 2002; McGhee 1996:139; Odess 1998:430).

Eastern Canadian Arctic: Cape Mugford chert. High-quality chert on the Labrador coast is also found in the Cape Mugford region. It is referred to variously as Cape Mugford or Cod Island chert, and the locations of several outcrops of Mugford cherts have been described by Gramly (1978) and Lazenby (1980). The Mugford Group is located in the Kaumajet Mountains about 145 km north of Nain, the northernmost inhabited settlement in Labrador, and consists of a series of volcanic and sedimentary rocks preserved in a northwest-trending syncline (Smyth 1976). Chert-bearing units occur at or very near sea level at a number of locations in the Cod Islands (Lazenby 1980). Cherts observed there by Lazenby (1980) were infrequently exposed and often in difficult locations, and were so extensively jointed that tool-quality pieces larger than 8 to 10 cm were rare. Lazenby (1980) provides detailed comparisons between Ramah and Mugford cherts' macroscopic characteristics, and describes prehistoric quarry sites, as well as petrographic work and neutron activation analysis. At Cape Mugford (Cod and Grimington Islands) Gramly (1978) visited workshops and outcrops, which contained blocks of opaque green, gray, and black cherts, as well as a few outcrops of very pure silica bearing resemblance to Ramah chert (Gramly 1978).

SOAPSTONE

Soapstone, also referred to as talc or steatite, is a metamorphic rock associated with ultramafic rocks and comprised of talc and other minerals. It has a characteristic soapy or greasy feel; is extremely soft and easily cut, carved, and shaped, and has excellent heat-retention properties (Frink et al. 2012; Hough 1898). The most common use of soapstone was in the manufacture of lamps and cooking vessels (Jenness 1946:55–68; Nagle 1984:361), but fishing plummets, carvings, beads, and charms were occasionally fashioned from soapstone (Murdoch 1892:402–403, 148–149). The Inuit on the west coast of Hudson Bay and the Copper Eskimo reportedly used steatite as bullets when lead was scarce (Ball 1941:47).

Maritime Archaic assemblages from southern Labrador constitute the earliest evidence of soapstone use in the Arctic, where fishing plummets are known from contexts as early as 7,500 years ago (Allen et al. 1978:237; Fitzhugh 1978). Subsequent Paleoeskimo settlers only rarely used soapstone for lamps (Mary-Rousselière 1976:41; Maxwell 1985; Schledermann 1990:318), though they later become a hallmark of Dorset assemblages found across the Canadian Arctic archipelago to Labrador and southern Greenland (Cox 1978; McGhee 1984; Meldgaard 1962). Later Thule migrants to the Central Canadian and eastern Arctic adopted soapstone lamps and cooking pots but in the west continued to rely on ceramic vessels (Jenness 1946:55–68; Morrison 1990). Soapstone vessels were traded widely and were considered the most important western export of the Copper Inuit (Morrison 1991).

Western Arctic. Deposits of soapstone occur in northwestern Alaska in the Jade Mountains and Cosmos Hills just north of the Kobuk River and on the eastern Seward Peninsula (Burch 2006:196), but there is no documented archaeological use of this local soapstone in Alaska. Soapstone vessels found in ethnographic and archaeological collections are rare in Alaska, occur very late in prehistory, and when present are presumed to originate from the Central Canadian Arctic (Ford 1959:Table 15; Morrison 1991; Murdoch 1892:60, 107; Nelson 1899:63).

Central Canadian Arctic. Numerous, scattered sources of soapstone are found across the Canadian Shield and cluster in three areas: the western part of Coronation Gulf, the Melville Peninsula and adjacent areas, and the southern portion of Baffin Island. The westernmost sources of prehistorically exploited soapstone are found in the Coronation Gulf. The most important and best-documented source there is found at the mouth of the Tree River (Ball 1941:47; Jenness 1923:53–54, 1946:59; Birket-Smith 1929a:38, 1936:150; Stefánsson 1919:25). Other occurrences of soapstone include a deposit on the south side of Coronation Gulf between Cape Barrow and Gray Bay (Jenness 1922:22), and an outcrop on the Rae River (Jenness 1946:59). Soapstone vessels were quarried and manufactured by the Copper Inuit residents of the area and were traded as complete

vessels (Morrison 1991; Stefánsson 1919:112–113). Material from Coronation Gulf reportedly supplied all the soapstone cooking vessels to the west as far as Siberia (Stefánsson 1919:112–113).

Large and small outcrops of gray, dark green, and black soapstone associated with the Prince Albert Group rocks of Proterozoic age (Beauregard et al. 2013) are found on the Melville Peninsula, southwest of Pelly Bay in and around Ukkusiksalik National Park (Wager Bay), and south to the area inland from Chesterfield Inlet (Ball 1941; Birket-Smith 1929a:38; Beauregard et al. 2013). Major deposits of excellent quality carving stone have been documented 120 km inland in the headwaters of the Kingora River (Beauregard et al. 2013), and 125 km south of Taloyoak on the Murchison River (Ball 1941; Beauregard et al. 2013). Balicki (1970:20) describes winter access to such inland quarries with the use of sleds. Other substantial soapstone deposits at Ajaqutalik River and Qukiutitalik Lake are accessible from the coast near Hall Beach and Repulse Bay (Beauregard et al. 2013). Birket-Smith (1929a:38) noted soapstone at Qiqertarjuaq and Rankin Inlet on the west edge of Hudson Bay and to the south at Lake Thaolintoa.

On the southern half of Baffin Island, especially the southern and southwestern coasts, are multiple soapstone deposits and traditional quarries. At least four deposits are found between Cape Dorset and Kimmirut (Beauregard et al. 2013; Sabo and Jacobs 1980), and others are known from Cumberland Sound near Opingivik (Ball 1941; Beauregard et al. 2013), at Markham Bay and Qikiqtarjuaq (Beauregard et al. 2013), and near Cape Dyer on Northern Cumberland Peninsula (Dudley 1972).

Eastern Canadian Arctic. Numerous soapstone outcrops are known to occur across the Quebec-Labrador peninsula and along the Labrador and Newfoundland coasts (Allen et al. 1984:3–4; Nagle 1984; Saladin D'Anglure 1984; Turner 1894:228). Outcrops are numerous and vary in size and quality, and the inventory of sources is certainly incomplete. Nagle (1984:405–409; Blackman and Nagle 1982) conducted the most recent and thorough analysis of geological and archaeological samples of soapstone from the region and rightly recommended conceptualizing soapstone provenance in terms of source areas rather than specific outcrops.

Four key source areas for soapstone on the Labrador coast include the areas around Hopedale, Okak, Hebron-Saglek, and Nachvak–Seven Islands Bay (Fitzhugh 1972, 1980; Nagle 1984:405–409; Sabina 2003; Tuck 1975). Although not examined by Nagle, Inuit place-names suggest other sources in the Freestone Islands north of Hopedale, particularly on Ukkusiksalik (“soapstone”) Island east of Napaktok Bay (Fitzhugh 1980:30; Nagle 1984:116; Sabina 2003). In Newfoundland an important soapstone source with clear evidence for prehistoric mining is found at Fleur de Lys and recognized as the Dorset Soapstone Quarry National Historic Site (Ball 1941; Erwin 2001; Sabina 2003).

Several efforts to characterize the geochemistry of soapstone sources in the Eastern Canadian Arctic have been mounted, but with mixed results (Allen et al. 1978, 1984; Nagle 1984; Rogers et al. 1983). Allen et al. (1978, 1984) used INAA to examine the

trace-element geochemistry of soapstone sources in Labrador and Newfoundland, and results suggested at least eight soapstone sources were in use over the past 4,000 years. Nagle (1984), however, also using INAA, found considerable chemical variation within single sources and overlap between distant sources, thereby complicating provenance interpretations. Nonetheless, some sources did seem to evidence distinct chemical fingerprints that could provide a good basis for source assignments.

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CHAPTER 6

PALEOESKIMO LITHIC TECHNOLOGY

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INTRODUCTION

PALEOESKIMO people succeeded in colonizing areas never occupied before. They were able to establish a successful way of life that endured for thousands of years in a harsh and variable Arctic environment. At the dawn of colonization of the world's most northern region, they had at their disposal one of the most advanced and diversified lithic technologies ever produced among hunter-gatherer societies. The remains of this technology are a key to understanding the successful Paleoeskimo adaptation to the polar world.

Lithic materials are among the best-preserved material remains found in Paleoeskimo sites, and are thus of crucial importance to understanding their way of life and behavior. Since the beginning of archaeological research in the Arctic, stone tools have been used as markers in the construction of regional cultural chronologies. Lithic technology entails complex knowledge and skill, and involves individual decision making as well as tradition. In the history of Arctic research many aspects of technology have been analyzed and reconstructed, despite the fact that tool-type morphologies have dominated lithic studies.

This chapter does not focus on broader issues (e.g., settlement patterns, site function, migration) that have been explored through lithic analysis. Instead, it focuses more on the lithic technology itself, as it characterizes the evolution of Paleoeskimo people from Alaska to Greenland. What raw material did they use, how did they make their tools and what for? Was there any variation in technology across time and space? Those aspects are presented below, organized in terms of the sourcing and characterization of raw materials, the techniques to transform them, the production of tool blanks, and the making and use of stone tools.

IN SEARCH OF RAW MATERIAL

The first step in lithic production is the acquisition of raw material and involves primary and secondary deposit sources. A primary deposit is usually a geological source where raw material is found in the location of its formation. Those areas are normally exposed through natural processes such as erosion, and the material can be collected through surface quarrying activities. Primary deposits permit access to material that typically has fewer internal fissures and cracks than materials retrieved from secondary deposits. It is thus assumed that people will try to secure these first, even if they are sometimes more difficult to reach than secondary deposits, which are characterized by raw material naturally displaced from its original formation location. This includes areas such as erratic block deposits, moraines, beaches, and riverbanks that often show no traces of extraction. Analysis of raw material at habitation sites in relation to the geology of a given region are among the best ways to determine that secondary deposits have been used as sources (e.g., Jensen and Petersen 1998:141–143).

In the Arctic, many lithic quarries have been recorded, and some studies of raw-material characterization have also been conducted. This research includes studies of Greenland microcrystalline quartzes (e.g., chert, agates, chalcedonies, and quartz), the metamorphosed schist called killiaq and soapstone (Jensen 2000; Jensen and Petersen 1998; Sørensen 2012), Labrador and Newfoundland chert, nephrite, and soapstone (Blackman and Nagle 1983; Erwin 2001; Gramly 1978; Lazenby 1980; Leblanc, 2010; Loring 2002; Nagle 1984; O'Driscoll 2003), Nunavik chert, quartzite, siltstone, nephrite, and soapstone (Archambault 1981; de Boutray 1981; Desrosiers 2009; Desrosiers and Rahmani 2003; Langlais 2011; Plumet 1981), Baffin and Southampton Island chert (Collins 1956:68; Milne 2003; Milne et al. 2011; Odess 1996), Northwest Territory siliceous argillite (Pilon 1990), Yukon “clinker” rocks (Le Blanc 1994), and Alaskan cherts (Tremayne 2015; Wenzel and Shelley 2001). The use of obsidian is associated with the Denbigh Flint complex; however, the sources in interior Alaska have not been clearly linked with this culture (Clark and McFadyen Clark 1993; Cook 1995:98). In addition, coarse stones such as basalt and rough quartzite were employed by Paleoeskimo people but have often been ignored by archaeologists (Lebel and Plumet 1991). For example, cobbles have been used as stone hammers (Figure 6.1:a–c), while blocks were used to produce flakes or specific tools such as stone grinders (Figure 6.1:d).

While some raw materials were used for many different tool types (e.g., chert and quartzite), other raw materials often had more specific use (e.g., crystal quartz, nephrite, slate, and soapstone). For example, Inukjuak siltstone (Figure 6.1:l) reacts like chert when knapped and like slate when ground, so it was used to produce tools usually associated with both types of material. It is thus no surprise that, locally, this type of rock is dominant in assemblages. A contrasting example is nephrite, which was used to make only a few specific tool types, mainly burin-like tools and adze blades, and therefore is usually a small percentage of raw material in assemblages.

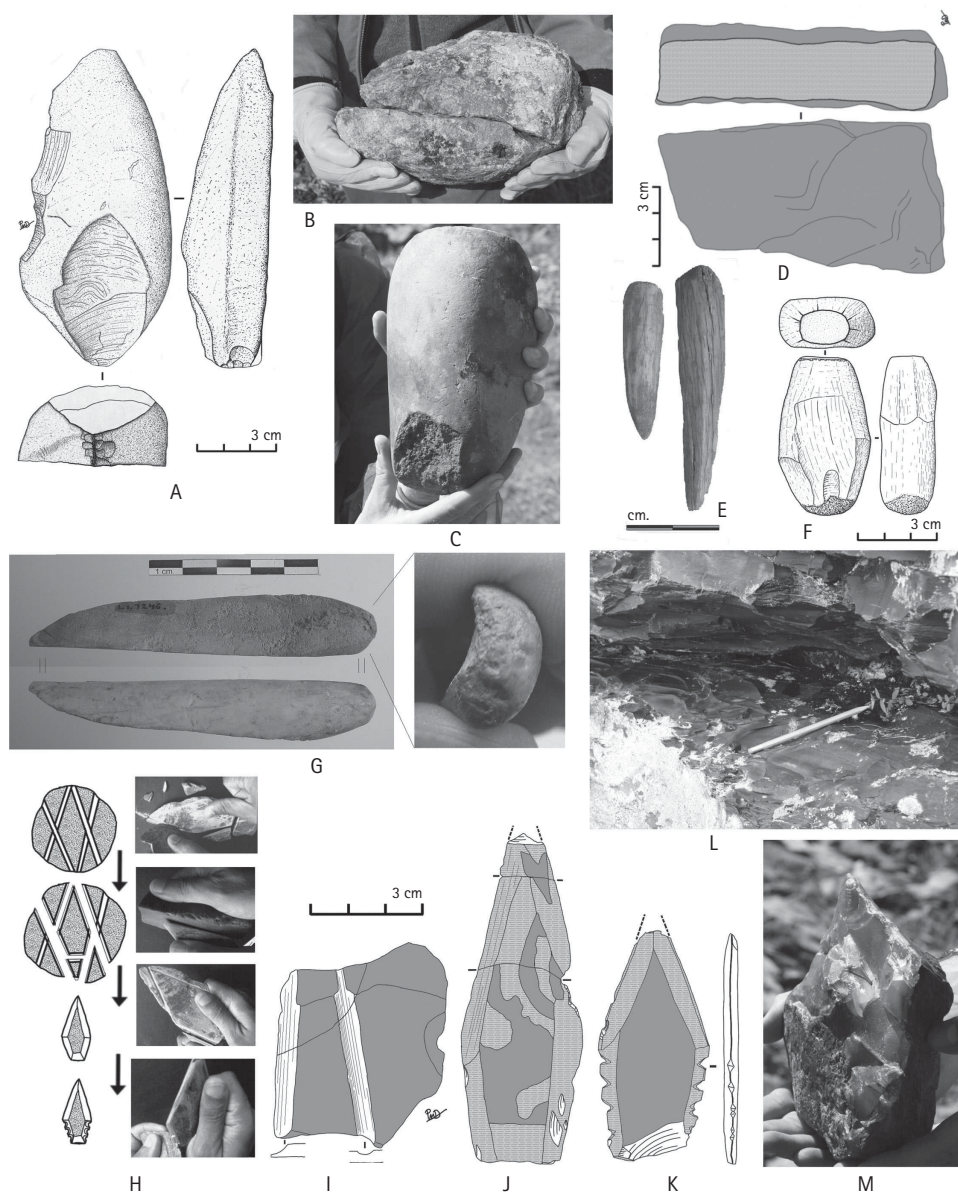


FIGURE 6.1 Flint-knapping tools, quarry sites, and slate technology. (a) Stone hammer: Tayara site (KbFk-7); (b) large two-hand grip stone hammer, abandoned after being broken in two parts: Naparutalik siltstone quarry site (IcGn-8); (c) stone hammer: Ramah quarry bowl (IfCt-1); (d) stone grinder: GhGk-63 site; (e) pressure tool tips: Blå flints boplads (Blue flint site); (f) soft hammer: T1 site (KkHh-3); (g) indirect punch tool: Solbakken site; (h) steps for making diamond-shaped points by grooving, breaking, and grinding the slate tablets; (i–k) slate tablet with grooves, diamond-shaped point preform, and diamond-shaped point: GhGk-63 site; (l) Inukjuak siltstone, flakes were detached directly from the outcrop: Naparutalik quarry site (IcGn-8); (m) flake core: Ramah chert quarry bowl. All drawings by Pierre M. Desrosiers; Photographs: (a–d, f, h–m) Avataq Cultural Institute; (e, g) Mikkel Sørensen.

Since the beginning of Arctic research, raw materials have been used for interpreting variation in lithic assemblages. For example, Mathiassen interpreted the Disko Bugt Stone Age as similar to the Thule culture except that Disko Bugt people had “a more pronounced stone culture” due to the abundance of lithic materials in the region (Mathiassen 1930:612). Since that time, raw-material variation (local or exotic) in assemblages has been used to interpret a great variety of past behaviors, including relations between groups of people, migration movement, changes in interaction patterns across time, seasonality, and cultural identity (e.g., Milne 2003; Odess 1996; Riddle 2010; Taylor 1968: 90–93). However, only a few researchers have explored the correlation between the availability of raw material, the form of introduction to the site, and the type of tool to be made (e.g., Dionne 2013; Leblanc 2000). We know that Paleoeskimo people transported raw material in the form of preformed cores, blanks, and small blocks, to be transformed at habitation sites usually close to the quarry (a few hours or days of travel). When identified in a site far from its source (a few weeks of travel or more), exotic raw material is usually found as finished tools or small rejuvenation flakes.

One of the best-known lithic raw materials in eastern North America is Ramah chert. Three quarries have been identified, and one of them has been described in detail: the Ramah chert quarry bowl (Gramly 1978; Lazenby 1980; Loring 2002). Ramah chert has been found in many Paleoeskimo contexts in Labrador, Newfoundland, Hudson Strait, and Ungava, and is associated with many tool types. In contrast, Maritime Archaic people exported large Ramah chert bifaces, often found in caches, which seem to have had a symbolic value related to the trade (Loring 2002).

The circulation of raw material is often discussed as if exotic raw material must have involved an exchange network or the arrival of new people (e.g., Anstey and Renouf 2011:199; Plumet 1981). In west Greenland, large preforms made from killiaq during the Saqqaq period and distributed as much as 1,000 km from its outcrop area are probably the strongest argument for the existence of an Early Paleoeskimo down-the-line trade system (Jensen 2000; Sørensen 2012). However, the body of ethnographic data concerning long-distance travel in the Arctic (e.g., Boas 1888) shows that the possibility of long-distance direct procurement must be considered (Nagy 2000:96). In a Paleoeskimo context, the presence of exotic raw material is frequently represented by finished tools of no obvious symbolic value, such as endscrapers, burin-like tools, microblades or endblades and their specific resharpening flakes. This raises the question as to why such tools would be exchanged across hundreds of kilometers. If this possibility cannot be entirely dismissed, it seems more probable that such tools would travel with the people who made and used them.

Only limited information about Paleoeskimo quarry extraction processes has been recorded so far. At rock quarries, where the lithic material is formed in layers in the bed rock, as seen for Ramah chert, large double-grip stone hammers are documented to have been used (Figure 6.1:b) to detach huge flakes directly from the outcrop (Figure 6.1:l). At these quarries, smaller stone hammers are generally found at a distance from the outcrop, where the preparation of cores and blank production was taking place. The extraction process at soapstone quarries is adapted to the specific properties of this stone and the objects to be produced, mainly containers and lamps. After a portion of the outcrop

surface was selected, it was sometime flattened before a delimitation of the future preform was engraved. It was then isolated by excavating around it, most likely by a combination of scraping and pecking, using rough picks and scrapers. This process usually began from the top and extended down to the narrower base before the preform was detached by breaking its base off the outcrop (Erwin 2001; Langlais 2011).

During the first part of the Early Paleoeskimo period, there appears to have been a preference for local raw materials, while during the subsequent Early Paleoeskimo period there is a diversification in the use of raw material (e.g., Nagy 2000; Owen 1988; Plumet 1981). This diversification is related to the development of different technological processes and tool types. Nagy (2000:96) proposed that it reflected a progressive adaptation to a new environment, starting with the first colonization of the eastern Arctic. As people developed new technology the situation was evolving toward greater need for diversified local and exotic raw material. At the beginning of the Dorset period this resulted in a range of tool types correlated to specific raw materials. However, their technology also allowed the substitution of one lithic raw material for another in the same type of tool. This flexibility seems to have been an important characteristic of the first part of the Dorset period. For example, tanged microblades would preferably be made in crystal quartz, but chert or milky quartz would also be used; nephrite would be used for making burin-like tools, but chert could also be used. Multiple notched diamond-shaped points would be made of slate, but chert could occasionally be used when slate was rare (Figure 6.1:i–k; Figure 6.2:j, k). While the earliest Dorset people did not depend upon specific raw materials, it is possible that this technological system may have become less flexible at the later stage of the Dorset period (Desrosiers 2007).

The quality of the raw material (the presence or absence of internal cracks or impurities) and its size seem to affect the size of the tools produced, as in the case of microblades (Owen 1988:192). When Dorset people had access to large pieces of homogeneous lithic material, such as Inukjuak siltstone or Ramah chert, they tended to produce larger tools (Figure 6.3:h; Figure 6.2:i). Is the size of the tools closely related to the nature of the raw material? Would Paleoeskimo people systematically make larger tools if they had access to larger raw material? These are questions that need to be explored. In addition, it is probable that most lithic quarries remain to be discovered. The majority of the recorded ones are still poorly documented in terms of activity, technique, and methods of extraction, as well as in terms of geochemical properties. Our current understanding is restricted to specific case studies, and a more global portrait of the situation is needed.

TECHNIQUES FOR TRANSFORMING RAW MATERIAL

Paleoeskimo people mastered a wide range of techniques, including the detachment of microblades and the production of bifacial tools by pressure (e.g., Figure 6.3:f–g;

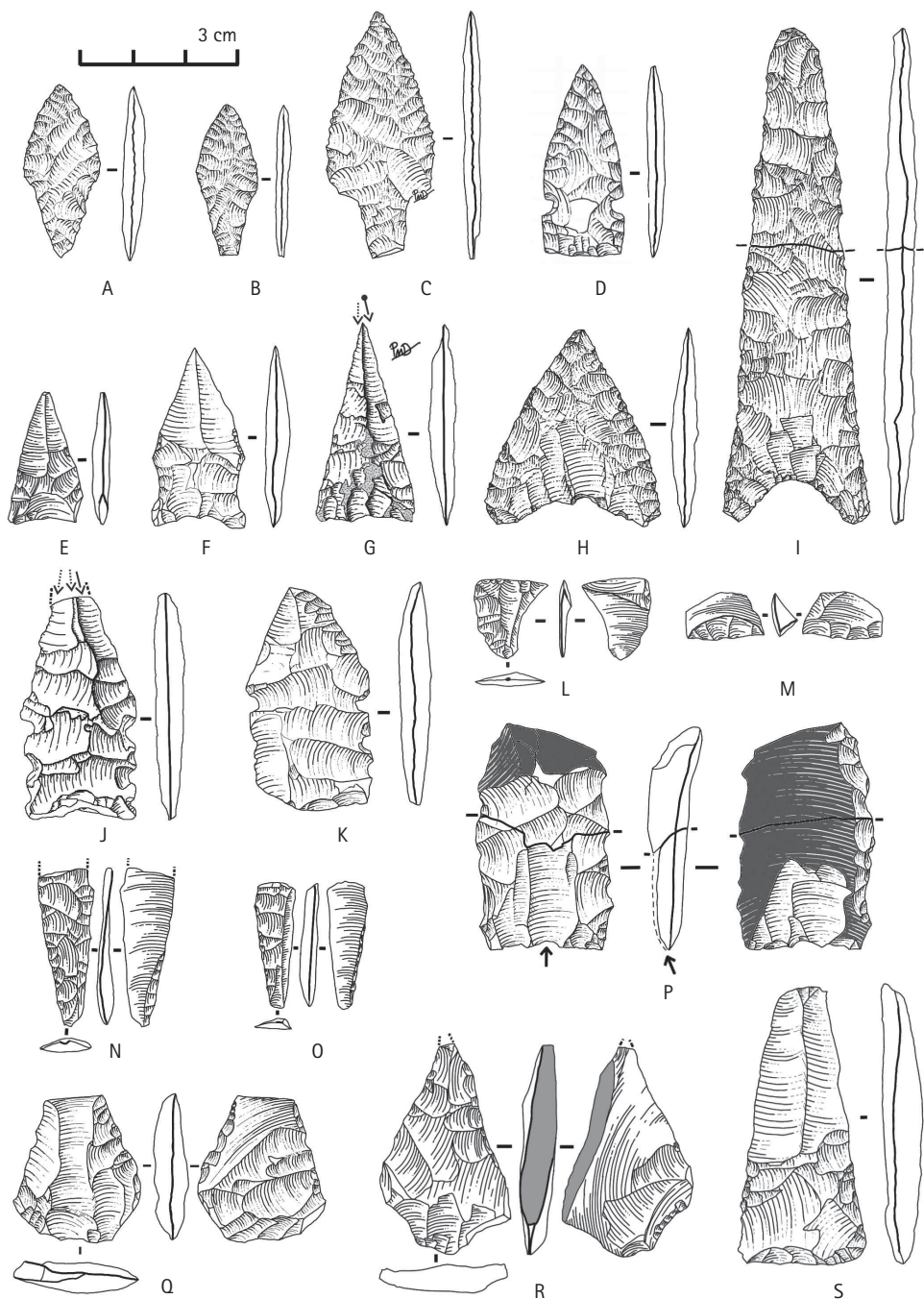


FIGURE 6.2 Chipped chert point production (except [i] = siltstone). (a) leaf-shaped point, IgDj-2 site; (b-c) leaf-shaped points KcFr-5 site; (d) box base point, Tayara site (KbFk-7); (e-f) tip-fluted point, GhGk-63 and NjHa-1 sites; (g) tip-fluted point partially ground, GhGk-63 site; (h) chipped point with concave base, Saputik collection; (i) large chipped point, siltstone, IcGm-5 site; (j-k) diamond-shaped point, GhGk-63 and NjHa-1 sites; (l) *outrepassé* flake accident, that took off the corner edge of a biface, GhGk-63 site; (m) direct percussion flake that probably produced an accidentally notched-like breakage along the edge of biface, GhGk-63 site; (n-o) tip-fluted spalls, GhGk-63 site; (p) refitted broken preform, accidental breakage *outrepassé* from a basal fluting, in dark gray residue of burnt material, Tayara site (KbFk-7); (q) biface preform, same accident as (p), GhGk-63 site; (r) biface preform, GhGk-63 site; (s) preform with tip fluting, T1 site (KkHh-3). (a-c) Pre-Dorset; (d) Groswater; (e-s) Dorset.

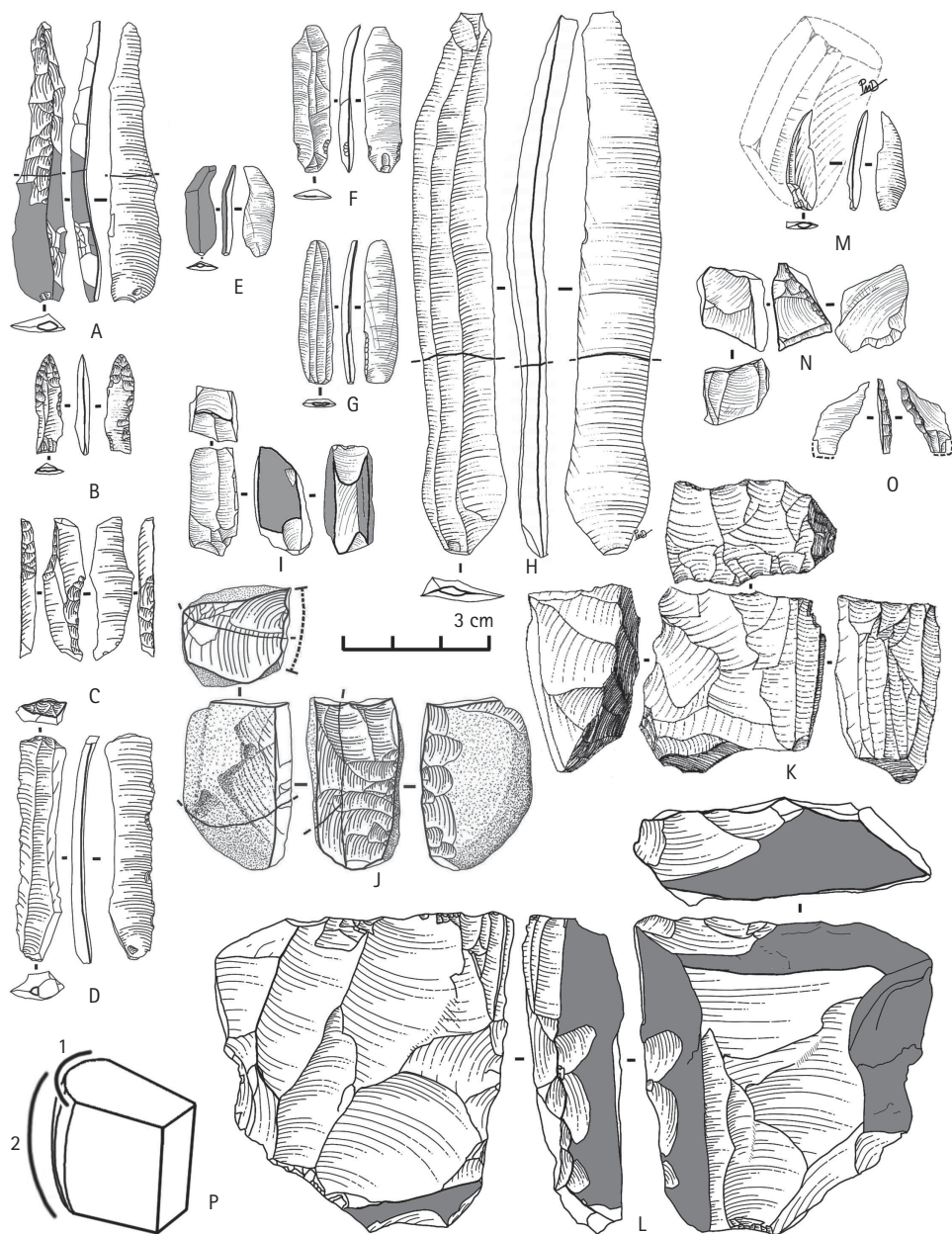


FIGURE 6.3 Microblade production. (a) Crested chert microblade, Tayara site (KbFk-7); (b) pointed chert microblade, Tayara site; (c) Calai chert microblade, Tayara site; (d) chert end-scraper, Tayara site; (e) primary ridge quartz crystal microblade, GhGk-63 site; (f) tanged quartz crystal microblade, GhGk-63 site; (g) tanged quartz crystal microblade, Tayara site; (h) Ramah chert large microblade (or blade), Rose Island site Q (IdCr-6); (i) quartz crystal microblade, Tayara site; (j) microblade core prepared with tan chert cobble, Tayara site; (k) chert microblade core, Adam C. Knuth site; (l) preformed microblade core, Nastapoka chert, GhGk-63 site; (m) flake detached for correcting the “cintre,” Tayara site; (n) core tablet flake, Tayara site; (o) core platform rejuvenation flake, Tayara site; (p) volumetric concept for microblade production.

Drawings by Pierre M. Desrosiers

Figure 6.2). Early Arctic archaeologists suggested that the pressure technique was used for microblade production (e.g., Collins 1956:70; Meldgaard 1952: 223). Much later, Owen (1988) presented strong arguments for its presence with a detailed attribute analysis, and this was followed with more recent studies. If we take account of the recent experiments with pressure blade production, the relatively small and thin microblades were probably produced by using a handheld pressure tool and holding the core in a device (Desrosiers and Sørensen 2012). Larger microblades such as crested microblades were often produced by indirect or direct percussion techniques (Figure 6.3:a, d, h).

Pressure tools or tool tips (Figure 6.1:e, g), soft organic hammers (Figure 6.1:f), and indirect percussion (punch) tools are only rarely described in detail (e.g., Gotfredsen and Møbjerg 2004; Grønnow 1996; Houmard 2011), but they are often mentioned from Paleoeskimo collections with organic components (e.g., Maxwell 1985). Their functions can be suggested through use-wear studies and by analogy to experimentally used tools and ethnographic data; for example, North Alaskan Inupiat people retouched blanks employing a pressure technique, using a spoon-shaped tool with a bone or antler tip for this purpose (Murdoch 1892).

Indirect techniques (punch) and soft-hammer direct percussion were used in microblade production, for retouching tool blanks and for bifacial reduction. Those techniques are occasionally mentioned (e.g., Riddle 2010), but remain poorly documented, and we could identify only one example of a soft hammer at T1 site, KkHh-3 (Figure 6.1:f). On the other hand, the direct percussion technique is well known through the common presence of stone hammers at Paleoeskimo sites. They range from small handheld pebbles (Figure 6.1:a, c) to large cobbles that must have been held with two hands (Figure 6.1:b) when used for extracting raw material at the outcrop.

Stone grinding is a well-attested technique that was employed by Paleoeskimo people (Figure 6.1:d). Hard stones, such as basalt, chert, and nephrite, were sometimes ground, while grinding was more often used with softer stones, such as slate, killiaq (metamorphosed schist), or soapstone. Burin-like tools, adzes, and multiple or single-notched slate blades, as well as soapstone containers and lamps, are among the most commonly ground stone tools. Grinding was also used as a finishing technique on some projectile points and burins. Experimentation shows that sand was most likely used in the grinding process for at least the finishing of steatite containers and lamps (Sørensen 2012).

Other techniques included the grooving (or cutting) of different material, especially slate sheets (Figure 6.1:h–k). Experimentation combined with the study of lithic debris has revealed that burins and simple flakes could have been used for grooving straight lines into one, or both, sides of a slate blank, after which the blank could be snapped along the groove (Benmouyal 1978:68–73; Harp 1964:62–64). If this technique was well known by the Dorset people and the later Thule- people, its first appearance in the earlier period remains to be better documented.

Finally, a technique that has been largely ignored in Paleoeskimo contexts is the heat treatment of microcrystalline lithic materials in order to improve their flaking properties. This technique dates to around 20,000 years ago in the Sibero-Mongol Upper Paleolithic, and is associated with the emergence of the pressure technique (Inizan and

Tixier 2001). Heat treatment is carried out by slowly heating a raw material up to around 250 degrees Celsius, and gradually cooling it down afterwards. Heat-treated material can be recognized due to its shining lustrous surface when flaked, and it often changes color toward reddish nuances. Heat treatment of preforms for bifacial tools and end-scrapers has been identified in the Dorset I tradition in west Greenland, where it generally seems to have been applied to most agates and chalcedonies that had to be worked by pressure. In northeast Greenland, heat-treated material from Paleoeskimo contexts has also been documented (Sørensen 2012).

THE PRODUCTION OF TOOL BLANKS

Flakes and microblades were the main blanks for tool production. Flake blank production was usually carried out with a low-energy investment; the knapper took advantage of the natural shape of the raw material to determine how to remove a series of flake blanks, most often with stone-hammer direct percussion (Desrosiers 2009). However, indirect percussion and direct soft-hammer percussion in combination with delicate trimming of the cores is seen in the Independence I tradition for the production of flake blanks. Flake cores have also been reduced with a bifacial strategy. This is especially frequent when the initial core blank is a large flake or a flat tablet. Those cores were sometime finally transformed into large bifacial tools, especially in Saqqaq contexts (Sørensen 2012). The blanks resulting from flake production are generally irregular, and often necessitate a significant investment in their transformation toward finished tools. Burins, burin-like tools, bifacial endblades, side- and endscrapers, and knives are among the tools associated with flake blank production. It has also been noticed that flakes originating from microblade core preparation were sometime used as blanks.

In contrast, microblade production necessitates higher investment in technological organization (Figure 6.3). It is thus no surprise that many specific by-products result from this production, such as striking platform rejuvenation flakes (Figure 6.3:o), core tablets (Figure 6.3:n), crested microblades (Figure 6.3:a), and flakes that are removed in order to adjust the blade core morphology (Figure 6.3:m). Paleoeskimo microblade cores have sometimes been described as having different shapes (e.g., McGhee 1970:89); however, those shapes represent exhausted cores. During the production process, the striking platform is usually a long, narrow surface perpendicular to the production surface (Figure 6.3:i-l), which also tends to be narrow, allowing the detachment of four or five adjacent microblades (Giddings 1967: 259). This volumetric concept is typical for Paleoeskimo and is present from Alaska to Greenland (e.g., Giddings 1967:363; Grønnow and Sørensen 2006:62; Morlan 1970:34; Owen 1988:241–245). Throughout the reduction process, the knapper will tend to maintain this ideal morphology, usually with a minimum convexity of the production surface (Figure 6.3:p). The relatively long striking platform favors the production of microblades in series from one face, and in this way the exhausted core very often has a pyramidal morphology.

The microblade production surface can initially be prepared by the formation of a crest, often single-sided, that will guide the detachment of the first microblade (Figure 6.3:l). The use of indirect percussion with a punch has been observed in association with this preparation within the Dorset culture. In other situations, a natural ridge formed by the intersection of two natural surfaces (especially with crystal quartz) could also be used for detaching the first blade (Figure 6.3:e), or sometimes irregular large blades are initially detached in order to create the first ridges. The production is almost always unipolar and often single-fronted. However, in some situations a new front is created, opposing the first front of the core or alternatively on the side of the core. When this situation appears, the core may give the erroneous impression of having a single surface of production extending toward its side around the core. However, careful observation shows that they are two adjacent surfaces of production used at different times (Desrosiers 2007). The core platforms are prepared by detachment of faceting flakes from both sides of the platforms during the exploitation of the core (Figure 6.3:k). Core tablets are rarely removed for preparing the striking platform, probably because they reduce the core length too drastically (Figure 6.3:n).

The best attempt to identify elements of change over time in microblade production is an attribute analysis carried out by Owen (1988). According to her, microblades from the earliest Paleoeskimo period were produced with a “well controlled pressure technique” (Owen 1988:122). She noted that microblade cores are rare and that the exhausted cores most likely were used for flake production or as tool blanks (Owen 1988:121). At the end of the Early Paleoeskimo period, she noted a diversification of raw materials used for microblade production that corresponds with an increase in microblade frequencies in assemblages (Owen 1988:125). She interprets the variability in core typology as resulting from “less strictly formalized” reduction strategies toward the end of the Dorset period (Owen 1988:124). Also, during the Dorset period microblades decrease in frequency and become “less carefully controlled” (Owen 1988:126) as their thickness and width progressively increase. In Greenland, Saqqaq generally exhibits very limited microblade production that is often of low quality compared to other Paleoeskimo cultures. This is probably related to a preference for killiaq raw material within Saqqaq assemblages, which is not appropriate for pressure blade production. The most characteristic difference seen between Independence I and Dorset I/Independence II concerns the angle between front and platform of the cores during microblade production. In the Independence I period this angle is around 90 degrees, while it is around 50–60 degrees in the Dorset I/Independence II period (Sørensen 2012). However, microblades are also narrower and generally more uniform in the Dorset I/Independence II than in Independence I (Owen 1988). Finally, tanged microblade knives are found only in Dorset I/Independence II. Therefore, different microblade hafting methods must have existed in the Saqqaq and Independence I cultures compared to the Dorset culture.

The production of Paleoeskimo microblades not only necessitated percussion and pressure tools, but probably also a holding system, such as a clamp or other device to fix the core while the microblades were pressed off (Desrosiers and Sørensen 2012).

However, the remains of such holding systems have not yet been recognized in the archaeological record.

Finally, slate sheets are another category of blanks that have been used. They were generally selected based upon appropriate shapes and characteristics that would allow them to be transformed into tools. It is preferable to detach slate sheets by hammering the side of a slab repetitively in order to obtain a blank of appropriate thickness to avoid the very long process of thinning a blank by grinding (Benmouyal 1978:70). When slate was sufficiently compact for bifacial reduction, this method was preferred to cutting and grooving in order to obtain preforms for tools such as multiple notched diamond-shaped points (Figure 6.1:i–k). Moreover, some by-products like exhausted cores or flakes were sometimes used as blanks for tools. One of the best examples is the use of a burin spall as an engraver or scraper (Tremayne 2010:83).

PREPARING AND USING LITHIC TOOLS

The Paleoeskimo people had a large inventory of different lithic tool types, including bifacial projectile endblades, sideblades, end- or sidescrapers, burins or burin-like tools, tanged microblades, notched slate blades, adzes, containers, and lamps. Flakes, microblades, and other blanks were selected in relation to the specific tool type to be produced. For example, a short and thick chert flake could be selected for the production of an endscraper, while a larger flake could be bifacially reduced in order to produce a harpoon endblade. A sharp and regular crystal quartz microblade could be transformed into a tanged microblade to be fixed in a handle.

Regarding microblade blanks, thickness seems to be one of the main criteria for their selection by Dorset people. Archaeologists commonly place microblades directly in the tool type category even if they are not transformed and show no use wear. By analyzing microblade tools such as side retouched microblades, tanged microblades and small microblade endscrapers it seems that regularity was often less important than thickness for the selection of the blank (Desrosiers 2009: 305). Certainly, the systematic classification of microblades as tools is erroneous and often contributes toward an exaggerated quantity of tools in a Paleoeskimo toolkit. It is, however, difficult to know if a microblade or a flake was used in its unmodified form as a tool for tasks such as cutting or grooving. Moreover many microblades seem to have been used as inserts in organic knife handles, either complete or with one or both ends snapped off. However, since the snapping also can occur during production, a snapped microblade cannot with certainty be attributed as either a tool or a discarded blank. Use-wear analysis and a careful study of each Paleoeskimo assemblage's specific technological characteristics can help to elucidate these problems related to microblade study (Dionne 2013).

Burin spalling and tip fluting were techniques employed in tool preparation that attest to variation in time and space within Paleoeskimo technology. Spalled burins in the Arctic were first identified in the 1950s and played an important role in the formation of

western and eastern Arctic cultural history (e.g., Collins 1951; Giddings 1951; Harp 1964; Knuth 1958; Meldgaard 1952).

Spalled burins were used to differentiate Early Paleoeskimo assemblages (Saqqaq, Independence I, Pre-Dorset, Groswater) from Late Paleoeskimo assemblages (Dorset). Burins were thought to have been ground more through time with a tendency to increase the grinding of the burin faces and the burin shaving edges (Harp 1964:117; Meldgaard 1960:593; Taylor 1968:86). Thus, within the Dorset and Late Dorset period burins are fully ground and were termed “burin-like tools” by Collins (1951). However, these early culture histories were constructed using erroneous radiocarbon dates and often mixed assemblages, thus creating confusion in subsequent decades about the contemporaneity of the burin and the burin-like tool. This caused them to be identified by some researchers as tool types with different functions used by the same people. Their presence and absence, or frequency, in assemblages was interpreted as related more to site function than to a significant technological evolution through time. This situation tended to discard them as cultural markers, especially under the influence of Maxwell (Maxwell 1976:73, 1985). In addition, individual tool type variability was considered by some as an obstacle to clearly differentiating archaeological culture (McGhee 1980). Due to these problems there is still a tendency to avoid burins and burin-like tools as chronological and cultural markers, and to rely heavily on absolute dating (radiocarbon) when attributing an assemblage to a specific Paleoeskimo culture. More recently, when burins are characterized in an assemblage by extensive grinding and well-shaped bases (as within the Dorset) but still involve burin spalling (as within the Early Paleoeskimo period), or when a site containing mainly spalled burins is dated to the formal Early Dorset period (from ca. 2800/2500 to 2300/2200 B.P. according to different authors), the assemblage is often defined as “transitional,” meaning a phase in which the Paleoeskimo culture developed into what we today define as the Dorset culture (e.g., Maxwell 1985; Nagy 2000). Recent reviews of the question tend to demonstrate a clear and progressive evolution from spalled to increasingly ground burins and burin-like tools, thus reassessing the earliest work and reinforcing the status of the burin as a significant chronological marker (Desrosiers 2009:383–388; Sørensen 2012:333).

The spalled burins produced by Early Paleoeskimo people were usually prepared from a chert flake blank, as observed in the Cape Denbigh assemblage of Iyatayet (Giddings 1967) and other Early Paleoeskimo assemblages (Figure 6.4:a–f, h). The flake was partially chipped on one or both faces, and a striking platform was minutely prepared on the distal end of the flake blank in order to detach the first burin spall. Following its use, more burin spalls were progressively detached on one or two edges, from the distal end of the burin. At around 3500 years B.P., the Pre-Dorset occasionally ground the surfaces of their burins. While in West Greenland, this trend was already seen from ca. 4400 in the Saqqaq tradition, where intensive grinding on the burin faces took place (Figure 6.4:h). Probably this technique was used here due to the tradition of grinding certain raw materials, such as killiaq or basalt-like materials (Grønnow 1996; Sørensen 2012:88ff). Even in the Cape Denbigh assemblage, spalled burins could, if they were made from more coarse-grained raw materials than chert, such as basalt and schist, have

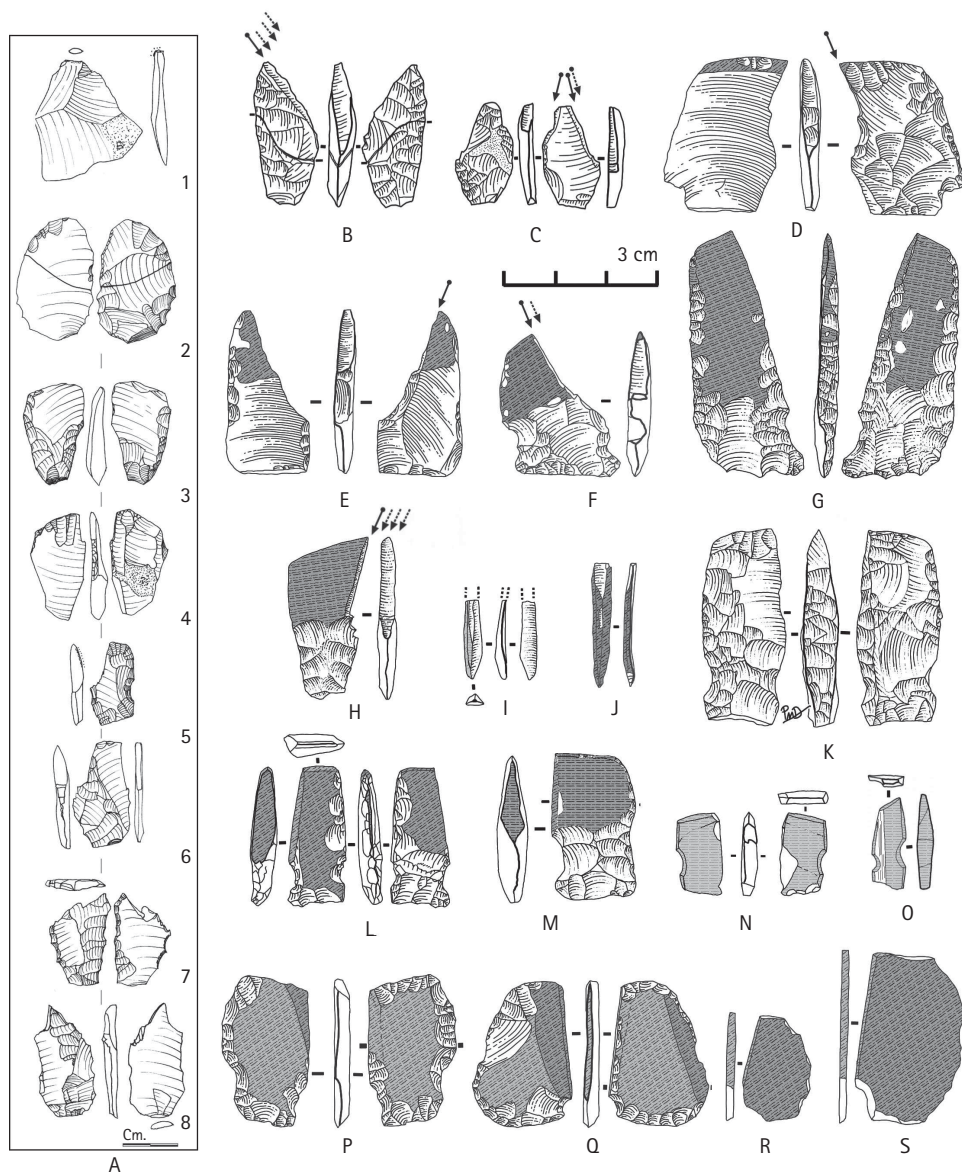


FIGURE 6.4 Burin production. (a) burin production from flake blank to rejuvenated discarded burin. Drawn examples are from the Adam C. Knuth site (Sørensen 2012:43). (1) Flake blank; (2, 3) burin preforms; (4, 5) finished spalled burin; (6) rejuvenated burins, twin type; (7) burin on lateral edge; (8) dihedral burin; (b–c) spalled burins, GhGk-4 site; (d–e) slightly ground spalled burins, IcGm-36 site; (f) spalled and ground burin, Tuurngasiti-2 site (HdGt-2); (g) burin-like tool, Independence II, Vandfaldsnæs site; (h) spalled burin, Itinnera site; (i–j) ground burin spalls, T1 site (KkHh-3) and Tuurngasiti-2 site (HdGt-2); (k) burin-like tool preform, T1 site (KkHh-3); (l–m) burin-like tools, chert, Tayara (KbFk-7) and T1 (KkHh-3) sites; (n–o) burin-like tools, nephrite, Tayara site; (p) burin-like tool, chert, IcGm-5 site; (q) burin-like tool, chert, JfEl-4 site; (r–s) burin-like tools, nephrite, JfEl-4. Associated culture: (a) Independence I; (b–f) Pre-Dorset; (g) Independence II; (h) Saqqaq; (k–s) Dorset. Drawings: (a) Mikkel Sørensen; (b–s) Pierre M. Desrosiers.

slightly ground faces (Sørensen 2012:330). Thus, the differences in choice of raw material and in burin technology are important elements when the Saqqaq tradition is differentiated from the Independence I or Pre-Dorset groups, for example in the High Arctic on Ellesmere Island and in the Thule region (Grønnow and Sørensen 2006).

In the central and high eastern Arctic, at around 3000 B.P., spalled burins become progressively more ground, including the burin tip and, partially, the burin edge (Figure 6.4:d–f). However, spalling is still used as the main process for rejuvenation of the burin edge, as shown by multiple spalling scars. Around 2200 B.P., burin-like tools replaced spalled burins in the eastern Arctic. At this time, and when it is made of chert or equivalent material, the burin-like tool is more or less square-shaped at its distal end, and has a ground shaving edge that is around 90 degrees perpendicular to the faces. The opposite edge is typically left with traces of chipping (Figure 6.4:l–m). When they are completed, no trace of spall removal is visible; however spalling is still sometimes used in the preparation of the preform and for rejuvenation, resulting in the presence of completely ground spalls. During the Dorset period in the central Arctic, burin-like tools were also made from nephrite. However, these are produced in a different process than those made from chert and similar materials (Figure 6.4:n–o). Notably, burin-like tools appear already ca. 2800 B.P. in Greenland within the Dorset I/Independence II culture. These burin-like tools show attributes different from the earliest Canadian Dorset ones; the ground shaving edge is usually less than 90 degrees and the distal end is more pointed than those seen on burin-like tools from the central Arctic (Figure 6.4:g).

During the Late Dorset period, flint knappers no longer used the spalling process, and the burin-like tool was prepared by flake reduction and extensive grinding. This type of burin-like tool has a large and flat morphology that must have required a great investment of labor during the grinding process (Figure 6.4:p–s). In terms of technology, the disappearance of the spalling process at the beginning of the Late Dorset probably represents a more significant change than the progressive evolution of burin grinding from the Early to Late Paleoeskimo period. This progressive evolution does not represent any change in the technical knowledge involved, but is more indicative of a shift in the intention of production. This may have been related to an improvement in the efficiency or durability of the tool, or it may simply have been a trend relating to style rather than function.

Concerning the bifacial tool inventory, the earliest Paleoeskimo chipped stone points were small, elongate, and leaf-shaped, showing a well-controlled pressure flaking process, often with finely serrated edges; these are usually interpreted as arrow heads (e.g., Giddings 1967; Maxwell 1985) (Figure 6.2:a–c). Toward the end of the Early Paleoeskimo period, this tool type disappears and in the central Arctic there is a change in morphology of the bifacial tool types toward larger and more triangular shapes with a straight base. In Newfoundland, Labrador, and northern Nunavik, side notches start to appear at the proximal end of the endblades, resulting in the characteristic Groswater “box-based” shape (Figure 6.2:d).

The disappearance of Early Paleoeskimo leaf-shaped stone point is often interpreted as indicating the abandonment of bow-and-arrow technology. Were leaf-shaped stone

points used for arrow heads while triangular endblade points were used for harpoon heads? If so, this does suggest a significant change in Paleoeskimo hunting methods around 2800 B.P. This change might possibly be related to the abandonment of drilled round holes, which are replaced by grooved elongated holes that occurred in the Dorset culture. Thus, it seems that the bow-drilling method disappeared at the same time as the bow-and-arrow technology (e.g., Maxwell 1985). Evidence for bows and arrows has been unearthed from the Saqqaq site Qeqertasussuk in Greenland, documenting the existence of this technology (Grønnow, personal communication).

Another element that was of importance in the making of Paleoeskimo cultural history is tip fluting, a technological innovation that serves as cultural marker to define the beginning of the Dorset period (Figure 6.2:e–g, j, k, n, o). Collins was the first to notice curious triangular “microliths” associated with what he defined as the Early Dorset period at the T1 site on Southampton Island (Collins 1956). A few years later these microliths were clearly identified as waste products resulting from fluting the distal edge of bifacial endblades (Meldgaard 1962). The spalls are often removed from both edges of the point, producing a very regular sharp tip (Figure 6.2:e–g). Much later, it was demonstrated that “tip fluting” does not only involve the tip of an endblade, but was also used to reduce the edge thickness of preforms throughout the bifacial reduction process, from the base as well as the tip (Plumet and Lebel 1997). The introduction of this innovation does not seem to significantly affect the shape of the point, but it was frequently employed as a finishing process leaving very characteristic scars at the tip of the final product. This is probably why the term “tip fluting” is still commonly used today despite the fact that it does not account for all uses of the technique; a better term might be “edge fluting.” As with the spalled burin, edge fluting disappears at the beginning of the Late Dorset period.

During the use phases of the lithic tool’s history, tool morphology will often evolve through processes of rejuvenation or resharpening and eventually breakage and reuse (Figure 6.4:a). This is especially true for spalled burins (Sørensen 2012). The analysis of macro wear and the identification of broken lithic tools are keys to understanding a tool’s function; for example, diamond-shaped points were often discarded when only the end tip was broken and without showing traces of resharpening. This shows that the tip of the point was crucial to their function (Desrosiers 2009).

The preservation of handles for lithic tools also contributes valuable information on the use of the tool. For example, the double-ended handle with endscrapers at both ends, would never be imagined if a perfectly preserved example had not been found at a Saqqaq site (Grønnow 1996). This also indicates that the small Pre-Dorset bow brace found in the Igloodik area should no longer be interpreted as a bow (Houmard 2011:104–105; Maxwell 1985:83, 88). The microblade de Calai (Figure 6.3:c) was found in association with a preserved handle, suggesting a reversible blade function, similar to the modern “boxcutter” knife. When the edge became dull, it was possible to rotate the blade in the handle in order to use the fresh cutting edge on the other side. This blade could also be used as a sidescraper on the other edge (Desrosiers 2007). The hafting of tanged microblades shows a system that permitted the flexible attachment and

replacement of microblades of different sizes (Owen 1988), and the same hafting system was used for burin-like tools. In addition, at least four other hafting systems for microblades were in use during the Paleoeskimo period (Sørensen 2012:288). Many lithic tool types have not been found hafted yet, which is one reason why much is unknown about exactly how they were used as tools. However, even for the tool types that have been found in direct association with handles, there are still many questions about their specific uses. Microscopic use-wear analyses have recently undertaken the task of answering some of these questions in Arctic archaeology (Dionne 2013; Knapp 2008; Tremayne 2010).

CONCLUDING REMARKS

The Paleoeskimo culture is characterized by a certain degree of homogeneity and coherence in technology over millennia that indicate continuity between Pre-Dorset and Dorset culture (Taylor 1968). This homogeneity is astonishing in terms of space, including territory spread over thousands of kilometers. Even for archaeologists, it remains difficult to encompass this space, and this may explain why many developed their own Paleoeskimo cultures at a variety of scales throughout the history of Arctic archaeology (e.g., Collins 1956; Knuth 1958; Meldgaard 1952, 1962; Taylor 1968). In this respect, it can be noted that the defined regional and chronological cultures are archaeological constructions, and not necessarily ethnic groups. For example, one of the key issues regarding Paleoeskimo archaeology in Greenland concerns whether there was a difference between Dorset I and Independence II, as they were defined as distinct cultures by Larsen and Meldgaard (1958) in Disko Bugt and by Eigil Knuth (1958) in Peary Land, respectively. In order to investigate this question, the lithic technologies of the two “cultures” were analyzed and it was found that in all aspects, except for the raw-material choice of burins in northernmost Greenland, identical technological concepts had been employed. As a consequence of this research, Dorset I and Independence II are today generally referred to as one cultural group termed the “Greenlandic Dorset” (Grønnow and Sørensen 2006; Sørensen 2012:320).

A great deal of complexity and capacity for adaptation to environmental constraints is shown in Paleoeskimo lithic technology. Despite some variation and evolution, it is remarkably consistent through space and time, and across different environments in this enormous region that extends from Alaska to Greenland and from the High Arctic to the tree line. Those aspects of the Paleoeskimo era stand in some contrast to the Thule people, who appear to have quickly developed regional subcultures shortly after their arrival in the Eastern Arctic, before coming into contact with the Europeans. The apparent homogeneity in the evolution of Paleoeskimo technology might reflect a strong capacity to stay in contact across great distances. It is also of interest to have information about how knowledge was transmitted from a generation to another. The recognition of

apprenticeship in Paleoeskimo lithic assemblages is a promising avenue in that direction (Milne 2005). Ultimately, careful and extensive studies of lithic technology, as well as the technology of organic materials, will allow us to have a better appreciation of the essence of the similarities and differences that have characterized the different groups that formed the Paleoeskimo culture.

Lithic tools and the associated waste material resulting from their manufacture are an important element of what we know about human settlement in the Arctic. Paleoeskimo societies produced rich and diversified toolkits that reflect a wide range of knowledge and hold a huge potential for reconstructing past behavior. Raw-material studies are of primary importance for understanding many aspects of these people, as this is the first step in documenting the specific choices that are made throughout lithic production. The vast and still relatively unknown Arctic landscapes challenge our investigations of lithic raw material, including the locations of quarry sites, the nature of lithic procurement strategies, and the circulation of raw material. Moreover, there is currently a need for more studies that take into account the methods and techniques that were necessary for producing and maintaining appropriate lithic toolkits.

In addition, precise analysis such as use-wear investigation and the refitting of lithic inventories would help with the interpretation of Paleoeskimo behavior, knowledge, social organization, and gender, especially when combined with intrasite investigations, involving spatially recorded artefacts. Ultimately, understanding of lithic technology will be improved by being incorporated into multidisciplinary research, taking account of site formation process (e.g., geoarchaeology), past environments (e.g., paleoecology), and the analysis of all categories of archaeological data (e.g., zooarchaeology, architecture). In this sense, the next challenge for Arctic archaeology is, in addition to the presence of generalists, to encourage and sustain the presence of specialists in more specific fields of research such as in lithic technology.

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CHAPTER 7

ARCTIC ARCHAEOMETALLURGY

H. KORY COOPER

INTRODUCTION

By the first century A.D. metals were integrated into the technology of western Arctic cultures and by the mid-second millennium A.D. were widespread across this region and parts of the Subarctic. Naturally occurring native copper, and meteoritic and telluric iron were available locally in some areas. Smelted metals were acquired via trade linking Arctic North America with metal-producing peoples in Eurasia, and after A.D. 1000, the Norse. The antiquity of the use of metal in the Arctic was noted during some of the earliest archaeological research conducted in the region (see discussion in McCartney 1988). McGhee (1984a:15) suggested Thule was an “Iron Age” culture due to its intensive use of metal, and McCartney (1988:58) referred to the dependence on metals by Thule and other Arctic cultures in the absence of smelting as “epi-metallurgy.” Archaeological evidence of the prehistoric use of metals across the Arctic and parts of the Subarctic is ubiquitous. As a result, a comprehensive literature survey of the archaeological occurrence of metals in prehistoric contexts is impractical within the space provided here. Alternatively, this chapter will provide an overview of: the use of metals across the Arctic and Subarctic, methods of analysis, and issues of archaeological visibility. This chapter will also summarize ideas regarding the movement of metals through networks of trade and exchange and offer suggestions for future research on this topic.

NATURALLY OCCURRING METALS IN THE ARCTIC AND SUBARCTIC

Native Copper

Copper that occurs naturally in a pure metallic state (often greater than 99.9 percent copper) is referred to as native copper. Native copper is malleable, deforming plastically when hammered, and can be worked using essentially a lithic toolkit. The melting point of copper is 1084° C. Extracting copper metal from ores composed largely of nonmetallic elements requires high temperatures that can only be achieved using a furnace. The process of hammering native copper into shape deforms the crystal structure, flattening individual grains, and compounds the formation of internal imperfections resulting in increasing hardness. This process of work-hardening makes the metal brittle, eventually causing fracture. Annealing is the process of heating work-hardened copper, which causes the metal grains to recrystallize, restoring malleability. Recrystallization typically can be achieved at temperatures as low as around 300° C, well below temperatures easily achieved in a wood campfire (Franklin et al. 1981; Wayman 1989a).

Western Arctic and Subarctic

Fifty-four discrete sources of native copper are reported for Alaska and Yukon (AK-YK). Most of these are found in southwestern Yukon and south-central Alaska and concentrated in the Wrangell and St. Elias Mountain ranges (Cooper 2012; Cooper et al. 2008). Native copper was used by many different ethnolinguistic groups and archaeological cultures in AK-YK, including: Athapaskan (Ahtna, Tutchone, Tagish, Dena'ina, Tanana, Upper Tanana, Koyukon, and Gwich'in), Eyak, Tlingit, Unangan, and Eskimo (Chugachmiut, Kachemak, Koniag, Thule, Norton, and Iñupiat). A literature review of the archaeological occurrence of native copper in Alaska and Yukon documented over 560 artifacts found at 77 sites. Native copper was used primarily for knife blades of various sizes and shapes, projectile points, awls and awl-like objects. Despite the emphasis on native copper's connection to social prestige in oral history there are few archaeological examples of native copper having been used for personal adornment (Cooper 2012).

The greatest use of copper was in south-central Alaska and southwest Yukon, corresponding with the traditional territories of the Ahtna, Dena'ina, Tutchone, and Chugach, but archaeology and oral history demonstrate it was also traded to the Tanana and northern Tlingit in significant quantities. More pieces of native copper ($n = 170$) have been recovered from the late Prehistoric Ahtna site of Gulkana than any other site in northwestern North America (Cooper 2012; Workman 1977). Native copper innovation in Alaska and Yukon may have begun around the mid-first millennium A.D. but most well-dated contexts indicate the peak of native copper use occurred A.D. 1000–1700, and

in southwest Yukon postdates the A.D. 803 White River ash fall. Native copper from this region reportedly traveled far down the Northwest Coast, but the archaeological occurrence of native copper falls off drastically outside of the large supply zone area (Cooper 2012). Late Prehistoric bone or ivory fishing lures with copper insets for eyes have been described for late Prehistoric northern Alaska (e.g., Giddings 1952), but whether this material is native copper from AK-YK, or the central Canadian Arctic, or smelted metal, is unknown.

Central Arctic and Subarctic

Many distinct sources of native copper have been reported for the central Canadian Arctic and Subarctic concentrated along the lower portion of the Coppermine River and the southern part of Victoria Island (e.g., Hearne 1958; see Franklin et al. 1981 and Rapp et al. 1990 for extensive lists of sources). Though few in number (total ~20), native copper artifacts have been attributed to Pre-Dorset and Arctic Small Tool tradition contexts, some of the earliest inhabitants of the Arctic (e.g., Franklin et al. 1981; McCartney 1988). The use of copper increases among Late Dorset people (e.g., Lemoine et al. 2003; Rowley and Rowley 1997) but the majority of archaeological evidence of the use of native copper in this region corresponds to after A.D. 1000, the period of greater use in AK-YK. After this time it was used by Athapaskans (e.g., Gordon 1996; Moodie et al. 1992) and Thule (Inuit) people (e.g., McCartney 1988; Rowley and Rowley 1997). Native copper was used for similar purposes in the Arctic as in south-central Alaska and Yukon, that is, knife blades, projectile points, and awls, though it appears to have been used more for needles and fishing tackle by Eskimo-speaking cultures. Native copper was also used for personal adornment in Thule culture (Morrison 1987). By the fourteenth century A.D., the use of native copper was widespread around the mouth of the Coppermine River, on southern Victoria Island, and beyond (Franklin et al. 1981), and native copper has been found as far east as Greenland (Appelt and Gulløv 2009). In the early twentieth century, native copper was still being traded out of source areas in nugget form and later worked into final shape by those without direct access (Stefánsson 1914).

Meteoritic Iron

Meteorites have long been used as a source of iron by many cultures. Iron meteorites found on Cape York in northwest Greenland are associated with a single meteor suspected to have fallen anywhere between 2,000 and several hundreds of thousands of years ago. Fifty-eight tons of meteoritic material has been recovered from the region and much more is likely on the ocean bottom. The composition of a metallic meteorite is an iron-nickel (Fe-Ni) alloy. This type of meteor always contains at least 5 percent Ni but may contain up to 60 percent. Analyses of Cape York material found the average

Ni content was around 8 percent (Buchwald 1975; Buchwald and Mosdal 1985; Wayman 1989b). Many meteors contain nonmetallic inclusions that when hammered cause fractures. The Cape York meteors have few inclusions and can be cold-worked with relative ease. Metallographic examination of artifacts corroborates the practice of cold-working meteoritic iron in the Arctic. The easiest material to use would have been the many small fragments created by the explosion when the Cape York meteor entered Earth's atmosphere, but people also chipped off small pieces from large meteorites weighing several tons. Meteoritic iron was used to make blades inset into bone or walrus-ivory knife handles and harpoons. In some cases, several small blades would be inserted in a single handle to provide a long continuous cutting edge (Buchwald and Mosdal 1985; Wayman 1989b). Meteoritic iron was used by Late Dorset people (e.g., Appelt and Gulløv 2009; Buchwald 1975) and has been recovered from many Thule sites in Greenland and the Canadian Arctic (McCartney 1988) as far west as the northwest coast of Hudson Bay, 2500 km from Cape York (McCartney and Mack 1973).

Telluric Iron

Telluric (naturally occurring or “native”) iron is rare but is found in significant quantities in a basalt formation on Disko Island off the coast of west-central Greenland, approximately 800 km south of Cape York (Bøggild 1953). The telluric iron used by Arctic people was in the form of small nickel-iron grains that when cold-worked produce flat fragments several millimeters in diameter. Like meteoritic iron, these pieces were inset into grooved knife handles or harpoon shafts. The distribution of telluric iron seems to have been restricted to the region immediately surrounding its source in Disko Bay. No telluric iron artifacts have yet been identified for the Canadian Arctic or other parts of Greenland. This metal was first used at some point before A.D. 1650 (Buchwald and Mosdal 1985; Wayman 1989b).

SMELTED (WROUGHT) IRON AND COPPER

Eastern Arctic

Norse populations from Iceland established two settlements in southern Greenland in the years between A.D. 982 and 1000. The Norse presence in Greenland lasted approximately 500 years (McGhee 1984a; Schledermann 2000). In the eastern Arctic smelted metals have been recovered from Late Dorset and Thule contexts (Franklin et al. 1981). Bog iron ore was smelted at the Norse settlement at L'Anse aux Meadows in Newfoundland (Wallace 2000). No sign of ore smelting has been found at Norse sites in Greenland, but there is evidence of the purification and forging of iron blooms, most likely produced in Norway (Buchwald 2001), and a fragment of a small stone crucible recovered from the

Nanook site on the southern coast of Baffin Island in the 1970s by Maxwell Moreau was recently found to contain traces of bronze (copper and tin) (Sutherland et al. 2015).

Eurasia

Siberian and Bering Strait Eskimos were using wrought iron by the beginning of the first millennium A.D. (Lebedintsev 2000 [1990]). The exact eastern origin(s) of iron traded into Chukotka and the Bering Strait region is unknown, but it was smelted in China early in the first millennium B.C. (Craddock 1995) and had reached the Okhotsk Coast within a few hundred years (Lebedintsev 2000 [1990]). Interior Siberian peoples on the upper Lena and in Yakutia were making and using iron by the first century A.D. (Okladnikov 1963, 1970). Smelted copper and copper alloys were used extensively in China during the Longshan period (2600–2000 B.C.) (Jianjun and Yanxiang 2003) and were present further north in Siberia by at least the end of the second millennium B.C. (e.g., Lebedintsev 2000 [1990]; Okladnikov 1970). Recent excavations at Cape Espenberg on the northern coast of the Seward Peninsula recovered six metal or metal composite artifacts from contexts dated to 500–800 years B.P. One object is smelted iron, two are copper, and two are alloys containing copper but also significant amounts of lead and tin (Cooper et al. 2016). For detailed discussions of possible sources of metallurgical innovation in Asia and Siberia and trade routes by which it might have reached the Bering Strait region, see Chard (1974), Okladnikov (1963, 1970), Levin and Sergeev (1964), Lebedintsev (2000 [1990]), and Mason (1998).

Drift Iron

An additional precontact source of metal available to indigenous peoples in North America was the flotsam and jetsam associated with shipwrecks (Keddie 1990; McCartney 1988). Most descriptions refer to the collection of “drift iron” by Alaskan groups living along the North Pacific coast such as the Tlingit (De Laguna et al. 1964:203), Koniag (Davydov 1977), and Aleut (De Laguna 1956; Hrdlička 1945).

Methods of Analysis

Compositional and microscopic analyses have long been used by Arctic archaeologists to analyze metals (e.g., Larsen and Rainey 1948; McCartney and Mack 1973). These methods continue to be used to identify metals, an important first step in understanding how metals were integrated into technological systems and patterns of trade and exchange. Ursula Franklin (1982; Franklin et al. 1981), a metallurgist, studied prehistoric native copper artifacts from the Arctic and Subarctic and discussed the origin and diffusion of this technology. The Mercury Series publication by Franklin et al. (1981) provides an

excellent annotated bibliography of metal sources and artifacts found across the North American Arctic, Subarctic, and Greenland. Buchwald and Mosdal (1985) provide an overview of the occurrence of meteoritic, telluric, and wrought iron in Greenland, and Buchwald (2001) later built on this work with a study of Greenlandic Norse iron technology and its use by the Inuit. Another metallurgist who has made a significant contribution to the study of pre- and postcontact Arctic metallurgy is Michael L. Wayman. He has conducted numerous compositional, trace element, and metallographic analyses that have added much to our understanding of the use of metals in the Arctic and Subarctic (e.g., Wayman 1989a, 1989b; Wayman et al. 1985).

Metallography

Metallography, the study of the microstructure of metals, is a routine component of archaeometallurgical research and can be used to discriminate between all of the metals available to ancient Arctic cultures (Buchwald and Mosdal 1985; Wayman 1989a, 1989b, Wayman et al. 1985). The microstructure of meteoritic iron usually has taenite inclusions which are absent in telluric or wrought iron. Wrought iron is characterized by the presence of slag inclusions aligned in a single direction due to forging. Telluric iron has a ferritic structure that is relatively free of inclusions (Buchwald and Mosdal 1985, Wayman 1989b). Native copper has very few nonmetallic inclusions and looks very clean microscopically. When native copper is cold-worked, individual metal grains become compressed and exhibit a layered pancake-shaped structure. When cold-worked native copper is annealed the flattened metal grains recrystallize, resulting in a new set of equiaxed grains. A single recrystallized grain will often have parts that are oriented in different directions, which can be seen microscopically as a set of parallel lines called annealing twins (Figure 7.1). Even relatively pure smelted copper can be distinguished from native copper microscopically based on the amount of nonmetallic inclusions, which appear as dark areas (Wayman 1989a; Wayman et al. 1985) (Figure 7.2). A drawback to metallographic analysis is that it requires the removal of a sample.

The use of scanning electron microscope with energy dispersive spectroscopy (SEM-EDS) provides the opportunity to combine an analysis of microstructure with compositional analysis of select areas of a sample. SEM-EDS produces the best results when used on samples of metal prepared for traditional metallography—that is, cut, mounted in epoxy resin, and polished—but it can also be used on whole artifacts to narrow the range of possibilities when examining metal of unknown composition. The size of an SEM's vacuum chamber will determine how large an artifact can be analyzed without sampling.

Composition and Provenance

Compositional differences between the various metals available in the Arctic allow for them to be identified and distinguished from one another using any number of

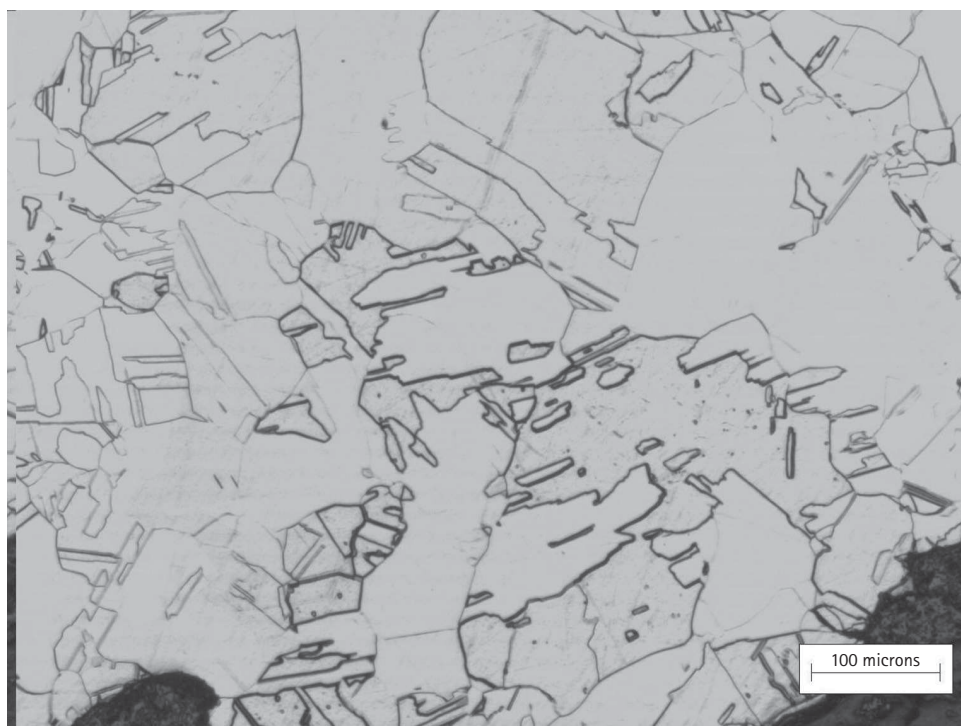


FIGURE 7.1 Cold-worked then annealed native copper. Note annealing twin pairs throughout microstructure.

Photograph by H. Kory Cooper

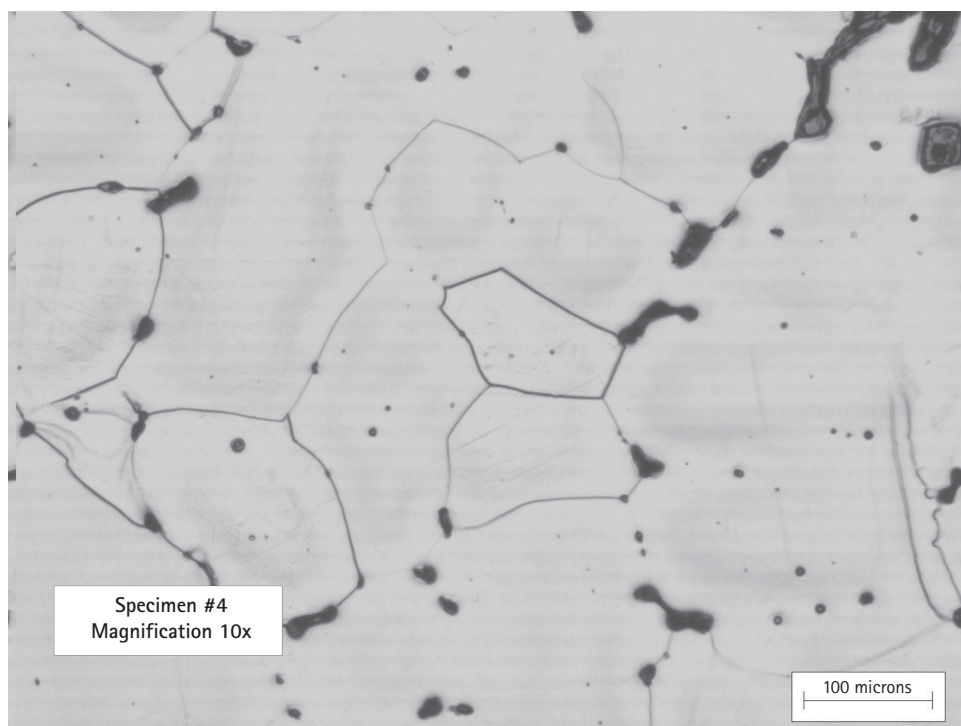


FIGURE 7.2 Historic smelted copper (catalog # 98.1046). Nonmetallic inclusions appear as dark globules.

Photograph by H. Kory Cooper, courtesy of the University of Alaska Museum of the North and the State of Alaska Office of History and Archaeology

instruments designed to analyze for major, minor, and trace elements, including various forms of spectrometry or spectroscopy, X-ray fluorescence (XRF), neutron activation, and scanning electron microscopy. Meteoritic iron always consists of over 5 percent nickel, whereas wrought iron has very little nickel. Telluric iron generally has 1–4 percent nickel and relatively more carbon than either meteoritic iron or wrought iron (Buchwald and Mosdal 1985). Because native copper is extremely pure, it has many fewer nonmetallic inclusions than historic-period smelted copper and copper alloys. Even “pure” unalloyed historic copper will contain a considerable number of trace elements found in significantly smaller amounts, or not at all, in native copper (Wayman et al. 1985).

Attempts to determine the geological origin of archaeological metals has proven difficult. The two methods most commonly used in archaeological provenance research are trace element and isotope analysis (Henderson 2000). Trace elements cannot be relied upon to source smelted iron or copper to the parent ore bodies from which they are derived. The pattern of trace elements observed in finished metal artifacts is not a reflection of just ore chemistry but also a result of smelting conditions, such as the use of fluxing agents added to lower melting points, and is impacted by the common practice of recycling metals over time. Furthermore, most ancient and historic mines have been so thoroughly excavated that currently accessible ores might not provide a good basis for determining the composition of ores mined in the past (Ixer 1999; see discussion in Henderson 2000). The use of isotope ratios to determine the provenance of smelted metals has also proven challenging due to the difficulty of locating ore samples characteristic of those used in the past and the effect of recycling metals on isotope data (see *Journal of Mediterranean Archaeology* 8[1] [1995] for a debate on the use of isotope data to determine provenance).

Though not affected by the problems found when dealing with smelted metal, native copper provenance research is also complicated. There are many fewer elements available for developing a unique trace element signature for native copper as compared to obsidian or clays and ceramics. Of the elements that are present, many are found in amounts near instrument detection limits. Rapp et al. (2000) performed trace element analysis on 368 native copper artifacts and geological specimens from 17 sources in North America and reported success in assigning the provenance of native copper artifacts from sites in Minnesota to specific copper sources in Wisconsin, Michigan, and Minnesota. However, when native copper from distant sources was included, several artifacts were “sourced” to Alaska and Arizona. Because the trace element signatures of native copper sources may be similar across space, Rapp and colleagues stressed the need to work within a “reasonable geographic framework of potential source deposits” (Rapp et al. 2000:96). A pilot study that analyzed artifacts and source material from south-central Alaska (Cooper et al. 2008) was able to differentiate between native copper sources in the region using trace elements, but the vast majority of potential sources have not been analyzed. Without understanding the trace element variability within and between sources in the two native copper-rich regions (Alaska-Yukon and Northwest Territories-Nunavut), trace element data obtained from native copper artifacts are of

limited interpretive potential. The analysis of lead (Pb) or copper (Cu) isotope ratios is an additional, but as yet untested, method that may be able to characterize native copper sources (see discussion in Cooper et al. 2008).

Curation and Archaeological Visibility

McCartney (1988) attributed the lack of attention given to metal relative to other components of the Arctic archaeological record to problems of visibility. Prior to sustained contact with outsiders in the eighteenth and nineteenth centuries, Arctic cultures used mostly small pieces of metal. Metal blades and gravers could potentially be used until there was practically nothing left, resulting in a high degree of metal curation and reduced archaeological visibility relative to the extent of its use (McCartney 1988; Morrison 1987). Morrison's (1987) study of the importance of copper in the traditional territory of the Copper Inuit found that, compared to archaeological contexts, ethnographic collections provided more examples of copper tools. This was explained as a result of curation. Lithic blades can be reused and recycled but due to their brittleness will at some point break into pieces too small to use. Though metal blades could also fracture, their malleability meant they would likely be useable for longer than lithic material and could be used up completely until there was nothing left for archaeologists to find. Many Arctic metal artifacts are very small pieces of metal left in wood, bone, or ivory handles of knives or engravers. Morrison (1987) also found that despite the influx of industrial smelted metal in the nineteenth century (Hickey 1984), copper tools were more abundant in Thule assemblages in traditional Copper Inuit territory than in archaeological collections dating to the late nineteenth century. An additional factor in the archaeological invisibility of metal is that small pieces of discarded or lost iron would corrode significantly in many Arctic burial environments over 1,000 to 2,000 years (McCartney and Mack 1973).

McCartney (1988:65, 1991:38–39) offered a number of suggestions to deal with this archaeological “blindness,” including the use of metal detectors to locate fragments of otherwise barely visible used-up metal and focusing on the design and manufacture of organic components of technology to identify metal use. The benefit of the former suggestion was demonstrated by the location and recovery of nearly 300 metal artifacts from Late Dorset sites by James Helmer and Genevieve LeMoine (Lemoine et al. 2003). There is significant precedence for the latter idea as the importance of metal in the Arctic is typically inferred from organic artifacts that are presumed to be fashioned with the use of a metal tool, or designed to hold a metal blade or graver, or that have rust or copper staining (McCartney 1988).

Collins (1937:146) described the blade sockets of Old Bering Sea bone and ivory knife handles as so narrow they “must have been designed for metal blades,” and subsequently (Collins 1953) considered the reduction in lithic technology to be evidence of the importance of metal to Thule people. Though Rainey (1941) found no iron in Okvik-period deposits at the Okvik site, he concurred with Collins (1937) on the use

of iron knives by Old Bering Sea people. Based on microscopic investigation of Old Bering Sea bone harpoons heads from Chukotka, Semenov (1964) concluded they were manufactured with a metal tool. Dumond (2008) noted that handles with sockets so narrow as to fit *only* iron blades are not evenly distributed within Okvik assemblages. Dumond further suggested that the introduction of iron could explain the stylistic difference Rainey (1941) observed within Okvik harpoon heads, that is, thin versus heavy. Gusev and Zhilin (2002) reported that at least nine iron artifacts were recovered from Old Bering Sea and Thule contexts on the Chukotka coast by the 1990s. Based on replication studies Gusev and Zhilin (2002:365) suggested that *all* bone and ivory toggling harpoons “with deep narrow grooves for lateral blades and the insertion of the shaft” were manufactured using iron tools. Dumond (2008) disagreed with this suggestion, but conceded iron may have been necessary for shaping thin toggling heads with closed sockets.

The width of blade slots presumably designed for metal blades ranges from .5 mm to 3 mm, depending on the researcher (e.g., Collins 1937; Gullason 1999; Larsen and Rainey 1948; McCartney 1988, 1991; Whitridge 2002). Gullason (1999) measured slate and metal blades from three Thule sites and found that slate blades averaged 3 mm in thickness, but contrary to earlier estimates, most metal blades were more than 2 mm thick. Whitridge (2002) measured the blade-slot width of tool handles from the Thule site of Qariaraqyuk and discovered a bimodal distribution for all tool types with modes of approximately 1.0 mm and 1.9 mm. Although Whitridge (2002) considered thinner slots as evidence for the use of metal blades, he acknowledged that many knife handles could have had thinner or thicker blades relative to the slot if packing material was added to fill the gap if thinner blades were used, or by physically or thermally expanding the slot enough to insert a thicker blade. The research of Gullason (1999) and Whitridge (2002) demonstrates the potential problem with inferring metal use exclusively by blade-slot width, and at the same time indicates the use of metal by the Thule culture was potentially considerably greater than even McCartney (1988, 1991) suspected.

TRADE AND EXCHANGE

Norse-Late Dorset-Thule (Inuit)

Meteoritic iron, native copper, and Norse metal (and other material) have been recovered from Late Dorset sites scattered across the eastern Arctic dating between the eleventh and thirteenth centuries (e.g., Buchwald 1975; LeMoine et al. 2003; Rowley and Rowley 1997; Sutherland 2000a). The Late Dorset use of metal may explain the increase in carvings during this period when compared to earlier Dorset culture, rather than ascribing the increase to changes in ideology and social relations (McGhee 1996). Appelt and Gulløv (2009) suggested the distribution of naturally occurring metals at Late

Dorset sites represents their long-distance transport in the hands of a small number of highly mobile people. The limited evidence that exists for Norse–Late Dorset interaction has been interpreted as the result of mutually beneficial peaceful trade, most probably the exchange of metal and other Norse goods for walrus ivory and skins (Odess et al. 2000; Sutherland 2000a, 2000b).

The discussion of Norse-Eskimo interaction has focused on the Thule (Inuit), as these sites contain much more Norse material than Late Dorset sites (Sutherland 2000b). Norse material found at Thule sites has been variously interpreted as evidence of limited contact and infrequent trade (e.g., McGhee 1984a), prizes won from the Norse by force (Odess et al. 2000), a single episode of trading, or scavenging an abandoned Norse ship, camp, or settlement (Schledermann 2000). Sutherland (2000a, 2000b) envisions relatively peaceful intermittent relations between these two groups spread out over several centuries and a vast area of the eastern Arctic. Metal-dependent Thule people would have been interested in obtaining Norse metal and the Norse were equally interested in furs and walrus skins and ivory, which were shipped back to Iceland and Europe (Odess et al. 2000; Schledermann 2000).

Thule

Old Bering Sea and Okvik, the earliest expressions of the Thule tradition, were believed to have used iron to engrave and groove bone and ivory even before iron artifacts had been recovered (e.g., Collins 1937; Ford 1959; Rainey 1941). The claim was finally supported by the recovery in the 1950s of a single iron engraving tool from a purported mid-first-century A.D. Old Bering Sea burial in the large cemetery at Uelen in Chukotka (Levin and Sergeev 1964), but may also indicate that iron was rare at the time (Chard 1960). The use of wrought iron for engravers and knives increases after Old Bering Sea and Okvik in Ipiutak (Clark 1977; Larsen and Rainey 1948), Birnirk (Ford 1959), and Punuk contexts (Collins 1937). Mason (1998:299) suggested little iron may have reached Bering Strait, but “its political or spiritual importance might have far exceeded its economic value.” Goods moving west in exchange for iron from Siberian peoples likely included walrus ivory and hides, seal oil, caribou skins, dogs, and umiaqs (Burch 2005; Mason 1998).

Hickey (1984) suggested that metal and other items could have moved quickly across the Arctic via kin obligations, that is, without formal exchange networks. This is similar to Stefánsson's (1914) earlier observation that down-the-line exchange could move a Siberian knife 4,000 km from the Bering Strait region to the west coast of Hudson Bay in only two and a half years. McCartney (1988, 1991) provided the first detailed discussion of the trade and exchange of metal in the Arctic. Using ethnographically known north Alaskan ranked societies as a model for Thule social complexity, McCartney (1991) suggested that Thule leaders would have controlled the movement of metals similar to the elite control of trade and exchange either documented or hypothesized for other ranked societies. Metals were circulating within and between complex societies in the Bering

Strait region prior to the migration of Thule people into the eastern Arctic (Mason 1998) and were used by the Thule for both tools and to express status and possibly prestige (McCartney 1991; Whitridge 2002).

The availability of metal in the eastern Arctic has been offered as motivation for the Thule migration by several archaeologists (e.g., McCartney and Mack 1973), but the most vocal champion of this idea has been McGhee (1984a, 1984b, 1996; Gulløv and McGhee 2006). Because Thule people had been using iron in the Bering Strait since the beginning of the first millennium A.D., those who migrated east across the Arctic around the thirteenth century (Friesen and Arnold 2008) were familiar with the use of metal (McCartney 1988, 1991). Upon reaching the central and eastern Arctic they found new sources of metal, native copper, and meteoritic and telluric iron. Thule migrants also found Late Dorset people, from whom they may have learned of these sources, and the Norse, from whom they obtained smelted iron and copper (McGhee 1996). The use of iron and copper was ubiquitous in Thule culture, and is found in all Canadian Thule sites (McCartney 1988, 1991). One might ask, why move east if metal is already available from Eurasian sources? But the very fact that metal was already an integral part of Bering Strait technology and a valued trade commodity means news of eastern metal could have been viewed as an opportunity to monopolize it. Concerned as it is with human economic motivation played out over a vast area, this attractive hypothesis is difficult to prove. Furthermore, there is little to no evidence that the paths of eastern and western metals crossed in the Arctic prior to or after the Thule migration, when the use of metals across the Arctic peaked (McCartney 1988; Mason and Maschner 2009).

The movement of metal goods such as knives and weaponry eastward across Bering Strait was ongoing at the time of Russian contact in the mid-eighteenth century (Golder 1922–1925) but archaeological evidence indicates Arctic cultures were participating in a mid-first-millennium A.D. world system (Burch 2005; Mason 1998; see also Collins's 1937 extension of the East Asian world system to Bering Strait). Trigger and Swagerty (1996) defined the onset of the protohistoric period in North America by the regional presence of European materials or diseases. By applying this definition to the Arctic, and including material from Eurasia, the Arctic protohistoric period began no later than A.D. 1000 in the east, and by at least 1,000 years earlier in the west. As a result, neither smelted iron nor copper is a reliable chronological indicator of either the initial pulses of historic contact in the sixteenth century or the contact sustained in the eighteenth and nineteenth centuries. The situation is further complicated by the use of locally available native metals by both Arctic and Subarctic cultures long after significant amounts of foreign metals became available in the eighteenth and nineteenth centuries.

No single mechanism of trade and exchange can account for the movement of metals across the Arctic and Subarctic during the last 2,000 years. A variety of mechanisms were probably responsible for the movement of metals across space in the Arctic, including down-the-line exchange, trade fairs, and raiding that often crossed ethnolinguistic boundaries (Burch 2005; Hearne 1958). Metals were

undoubtedly an important part of Arctic and Subarctic technology and individuals with elevated status, or rank, may have exerted control over their trade and exchange (Cooper 2012; McCartney 1991). That fact that metal was commonly used in the Arctic and Subarctic with ulu handles, a tool traditionally associated with the processing of fish by women (Frink et al. 2003), means that women likely played a major role in the decision to adopt metal as raw material for tools. Due to the localized and potentially remote nature of metal sources, access to them could have been easily restricted by not sharing information. However, their widespread archaeological occurrence in some areas undermines to some extent their classification as exotic prestige goods. Before the eastward migration of Thule culture, knowledge of how to use and work metals was already widespread in the Arctic and parts of the Subarctic. The extensive occurrence of a variety of metals in the Arctic, both locally available and foreign, in Thule sites demonstrates they had already established the long-distance trade and exchange networks described during the early historic period (McCartney 1988).

Innovation and Diffusion

Franklin et al. (1981:35) considered hammering and annealing to be the “primary” means of working native copper in the Arctic and Subarctic, and emphasized the role of diffusion in the spread of native copper technology across these regions (Franklin 1982; Franklin et al. 1981; and see also Clark 1991). Diffusion certainly played a role in the spread of this technology but the idea that annealing, and metallurgy more generally, is more complex than other technological activities found in hunter-gatherer societies is an example of what Pfaffenberger (1992) called the Standard View of technology. This view characterizes technological change as the continuous replacement of simple tools with more complex tools in response to need. Furthermore, Hickey (1984) disputes the contention of Franklin et al. (1981) that the practice of annealing was widespread in the Arctic. Presumably annealing was less of a priority in the absence of fuel for fires as ethnographic sources emphasize only cold-working among the Inuit (Hickey 1984).

Hammering and annealing were the primary means of working native copper almost everywhere it was used in the past (e.g., Ehrhardt 2009 on prehistoric eastern North America; Stech 1999 on the Chalcolithic Middle East). Thus, the discovery that temporarily heating (annealing) native copper would affect its physical properties appears to have been repeated multiple times. Additionally, though annealing was commonly practiced whenever and wherever native copper was used as it provides the copper worker with greater flexibility and working time, it is not absolutely necessary. Smith (1968) performed a cold-working experiment on native copper and found that the thickness could be reduced by 96 percent by cold working alone, without annealing, thus demonstrating the potential to expediently create a useful metal tool. A recent experiment found that awls, one of the more common native copper artifacts in Alaska and Yukon, could be manufactured in a matter

of minutes without annealing, depending on the size and shape of nuggets selected for use (Cooper et al. 2015).

According to AK-YK ethnohistory, native copper technology was an Athapaskan innovation that was transferred to the northern Tlingit (e.g., De Laguna et al. 1964; McClellan 1975). Yellowknife and Chipewyan Athapaskan oral history recounts the discovery of native copper somewhere to the west, where there are mountains, a volcano, and rivers flowing into the ocean (Moodie et al. 1992). As Moodie et al. (1992) note, this accurately describes south-central Alaska and the southwestern Yukon Territory. However, the discovery of native copper in this body of northeastern Athapaskan oral history also involves interaction with Eskimo people. Several indigenous place-names incorporating terms for copper are found in AK-YK (Cooper 2011). Most of these are Athapaskan but there are two Chugach copper place-names in Prince William Sound, *kanawlek*, “copper place” (Birket-Smith 1953), and *kanuwalem kuiya*, “creek of one that has copper” (Bright 2004). In the West Central dialect of Inuit, *kannuyaq* means “place with copper nuggets” (Collignon 2006). Despite the widespread use of a single term for copper in the Eskimo language, the relationship between Chugach and Inuit native copper technology is unclear, as is the relationship, if any, between the development of this technology in south-central Alaska and southwestern Yukon with that in the central Arctic and Subarctic. Regardless of the motivation, different groups could have independently recognized the potential value of naturally occurring metals for tools.

Future Directions

McCartney’s (1988, 1991) use of the term “epi-metallurgy” has been only minimally integrated into discussions of Arctic archaeometallurgy but his suggestions regarding how to maximize the research potential of this material are still quite valid. Included in this list were: compositional analysis, study of organic materials, careful screening of excavated sediments, and use of metal detection equipment. In order to build on McCartney’s (1991) above recommendations for how to get the most out of archaeometallurgical data, the following suggestions are offered.

- (1) Given the issues of using blade-slot width as a proxy for metal use (Gullason 1999; Whitridge 2002), such a measurement should be used with caution. Elemental analysis of organic surfaces to detect mineral residues might provide additional support for the use of metals.
- (2) Identifying the composition of metal artifacts does not automatically allow them to be dated in the absence of other methods. However, compositional and metallographic analyses can differentiate between the major types of metal available in this region and thus provide a necessary first step in not only accurately describing metal artifacts but narrowing the range of possible origins. With the proliferation of portable and relatively inexpensive XRF technology there is greater potential to gain new insight from existing museum collections in a nondestructive manner.

- (3) Literature-based surveys of the archaeological occurrence of metal in particular regions and subsequent development of geographic information systems are time-consuming but essential for developing a detailed picture of the use and movement of metals across time and space.
- (4) Experiments replicating the manufacture and use of metal and organic tools have added considerably to our understanding of the importance of metals in the Arctic. In particular, studies such as Frink et al. (2003), that quantify the comparative efficiency of metal versus other materials, provide an opportunity to integrate studies of metal use into Behavioral Ecology or Behavioral Archaeology approaches.

Arctic archaeometallurgy can be used to investigate anthropological issues such as: long-distance trade and exchange (e.g., Mason 1998; McGhee 1984a), the development and maintenance of social complexity (e.g., Cooper 2012; Hickey 1984), culture contact (e.g., Gullason 1999; McGhee 1984a; Sutherland 2000a, 2000b), technological innovation (e.g., Cooper 2012; Clark 1991; Franklin et al. 1981), gender and technology (e.g., Frink et al. 2003; Gullason 1999; Whitridge 2002), Eskimo origins (e.g., McCartney 1988; Rudenko 1961), and migration (e.g., Gulløv and McGhee 2006; McCartney and Mack 1973; McGhee 1984b). Despite the long-hypothesized importance of metal in ancient Arctic and Subarctic technological systems, the great deal of interest shown in metal finds in the region, and the valuable contributions of several archaeologists and metallurgists to Arctic archaeometallurgy, this area of research is far from exhausted.

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CHAPTER 8

ARCHAEOLOGY AND NATIVE NORTHERNERS

The Rise of Community-Based Practice across the North American Arctic

NATASHA LYONS

INTRODUCTION

THIS chapter traces the evolving relationships between archaeologists and indigenous communities across the North American Arctic. Over the past 40 years, native north-erners have increasingly demanded a stake in their archaeological heritage, shifting the ways that archaeology is perceived, negotiated, and conducted. The chapter describes elements of community-based practice as they have developed in the north, and illus-trates some of the forms, applications, and outcomes of this research.

Northern native communities have always been interested in their foundational sto-ries, histories, and material culture, and sustain rich, nuanced, and varied relationships with the past. The past was traditionally recounted in winter dance houses, seasonal gatherings, and journeys across the landscape of northern families, as they taught their children about the land, its resources, and their livelihood and survival upon it. In pre-contact times, Inuit (and presumably other northern indigenous) parents taught their children about their collective family histories through the material remains of their ancestors, which they routinely encountered on the landscape (Bennett and Rowley 2004:143–149). Inuit and their forefathers, the Thule, told stories of the earlier Tuniit people (the Dorset to archaeologists), and sometimes collected and curated Tuniit arti-facts (Park 1993). Dene people of the middle and upper Mackenzie drainage tell a series of story cycles about a giant hero who battled megafauna to create the topography of Denendeh. Dene knowledge appears to stretch back to late Pleistocene times, and is then traced forward through the emergence of landscape features within the massive basin

of postglacial Bear Lake (Hanks 1997:187). Similar connections between origin stories, landscape, and the artifactual record are found amongst Alaska Native, Greenlandic, Cree and other, perhaps all, communities throughout the circumpolar north (e.g., Denton and Cree Regional Authority 2001; Grønnow et al. 1983; Stewart et al. 2000).

The disruptions of European contact are familiar and well rehearsed in both the oral and the written histories of native northerners. Yet it is difficult to convey or understand the veritable fracturing that would repeatedly occur, at different time scales, to subsistence practices, social relations, traditional rivalries, and collective belief systems in indigenous communities across the Arctic. Long-held traditions, beliefs, and origin stories were aggressively displaced by European moral and ideological frameworks, and the identities of northern peoples called into question (by the outsiders, and later, in domino effect, by themselves). Traditional modes of oral transmission were literally colonized by the written pedagogies of the newcomers, and over time, some groups of northerners lost their ability to speak their own languages (Lyons 2010). Europeans would effectively usurp control of the interpretation and dissemination of northern histories to the outside world (cf. Pratt 2004).

It seems no surprise that, as Arctic indigenous peoples sought to resume political, economic, and cultural responsibility for their communities at different time scales across the north, they would also reclaim the rights to tell their own histories. This process was formalized by the settlement of comprehensive land claims, which many native northerners pursued to achieve greater ownership and sovereignty over their lands and resources, and by extension, to gain control over less tangible rights, such as the right to conceive and administrate culturally appropriate social services, health and education resources (Balzer 1999; Dahl 1988). A critical part of this process has entailed the regulation of research activities, and in this regard, northerners are swinging the pendulum back to a place where the conception and telling of family histories resides in local homes and communities. This radical shifting of relationships between cultural insiders and southern outsiders has caused some considerable renegotiation of the whys and hows of conventional research practices, placing emphasis on the building and maintenance of relationships and the equitable dissemination of research results and products (e.g., Hollowell 2006; ITK and NRI 2007; Pearce et al. 2009).

This chapter examines the history of entanglement between local communities and the newcomers who sought to understand and characterize northern pasts from a Western scientific perspective. I present an overview of the development of community-based archaeology practices in the north, placing their roots in the growing social awareness and incitement of the late 1960s, and developing over the course of decades as part of the regulatory changes that were precipitated as northerners began to question the status quo. The term “community-based archaeology” is used to convey an approach that incorporates community objectives and perspectives from the outset of research through to its conclusion, recognizing that the level of engagement exists along a wide spectrum (Atalay 2012; Lyons 2013; Nicholas 2010). It incorporates a broader suite of data and methods than traditional archaeology, in accord with indigenous perspectives that suggest that archaeology is just one aspect of the larger heritage enterprise,

including a diminished emphasis on excavation. Its focus on process and negotiation brings this approach to archaeology clearly into the realm of participatory practice (Robinson 1996).

While this chapter conceives of the Arctic in broad terms, it is far from comprehensive in its treatment of circumpolar peoples and their respective histories. My own knowledge and experience lies in the Canadian Arctic, which is well represented throughout the chapter. I have attempted to counter my own biases by incorporating examples of community-based archaeologies practiced by Native Alaskans, and to a lesser extent Greenlanders. I consider how northerners perceive archaeology and its attendant practice, as well as looking at the actions and reactions of members of the Arctic archaeological community as they both pursued and responded to this paradigm shift. I conclude by discussing the prospects for community-based research practices in Arctic archaeology, the criteria for success, and anticipated directions for the future.

HISTORICAL PRELUDE TO COMMUNITY-BASED ENGAGEMENT

Robert McGhee calls the Arctic “the last imaginary place,” in deference to the historical perceptions European newcomers formed of Arctic landscapes and northern peoples. Outsiders have often, if not always, treated northern peoples as “others,” who live(d) and thrive(d) in a hostile and combative environment. McGhee (2004a:9) suggests that outsiders constructed the idea of an alien and hostile north, peopled by “ingenious, resourceful natives” and “intrepid explorers,” to comfortably fit their armchair notions of home vs. away, cultivated vs. wilderness, and safe vs. dangerous. These ideas of north are not shared, however, by northern populations, who see their homeland much as others do, within the safe fabric of knowledge and familiarity (Berger 1977; Kassam 2001).

This perception, however, guided the mindset of colonizing nations, who looked upon aboriginal societies and their attendant systems of economy, trade, and resource extraction as “underdeveloped” (whereas in fact they operated under entirely different principles; Chance 1990:216). American and Canadian nation states found particular interest in the north following the Second World War, when the goals of building social policy and economic infrastructure came into critical view. The flurry of resource development and modernization initiatives that followed met with mixed success, in the latter case, largely because northern populations were scarcely consulted on the mass relocations, new educational policies, and regulatory environments that intruded heavily on land-based lifestyles (Alunik et al. 2003; Damas 2002; Scott 2001). In following decades, a concerted emphasis was placed on studying the “acculturation” of northern indigenous peoples into the wage-based, town-centered economies that were parachuted into Arctic communities (e.g., Honigmann and Honigmann 1970). Many of

these studies noted the “resistance” of northerners (Fossett 2001; Tester and Kulchyski 1994), such as the Inuvialuit and Gwii’chin residents of Aklavik, Northwest Territories, who placed a sign on the airstrip that said “Never Say Die” in response to government entreaties to move to the new town of Inuvik (Brown 1998:67).

Several national and international events and movements conspired to push northern indigenous communities to greater political organization and agitation, beginning in the late 1960s. The general environment of dissent was fostered by the American Indian Movement, the women’s movement, the social liberalism of the 1960s, and the public’s increasing awareness of indigenous issues through the popularization of accounts of American Indian history (e.g., Brown 1970; Deloria 1969). In Canada, Pierre Trudeau’s infamous White Paper of 1969, which proposed to assimilate First Nations into the mainstream of Canadian society through the abolishment of the Indian Act, spurred many aboriginal groups to action. As part of this wave, Chief Justice Thomas Berger’s commissions in the Western Arctic precipitated the move toward the establishment of land claims in the Canadian Western Arctic (Berger 1977), and later towards the revision of the Alaska Native Claims Settlement Act (Berger 1985).

Most archaeological investigations in the North American Arctic were initiated in the period after the Second World War and flourished in this environment of heightened change and intensive cultural interaction. Yet, stemming from a scientific rubric and trained on the goal of discovery, this research operated in a generally depoliticized context and often at arm’s reach to local communities. Locals were sometimes consulted as to where archaeology sites could be found and, in many cases, were hired to guide and provision (some would argue that this was an early form of community archaeology). In many areas, these interactions followed on earlier relationships founded on local trade in grave goods and household items for curios and to furnish museum collections (Richling 1995). Amateur collecting of grave goods began in parts of Alaska in the late nineteenth century, for trade with tourists along the Inside Passage and with museum collectors. On St. Lawrence Island, this industry commenced some decades later, and was driven by Native Alaskans, whose rich and varied history the trade relied upon (Hollowell 2004:197).

If anything, the relationships between archaeologists and northern indigenous communities grew more distant with time (Loring 2008:184). The processual bent of 1960s’ and 1970s’ archaeology served to objectify aboriginal peoples through generalizing principles, reductionist categories, and the treatment of indigenous communities and their histories as a means to an end (Trigger 1980:671). The reigning paradigm, to quote Rowley (2002:264), “left little or no role for the Inuit [and other northern indigenous communities] and their interpretations of the past.”

The transformation of archaeological research relationships in the North American Arctic was part of the larger questioning of anthropological practice that manifested in archaeology as part of the postprocessual movement. The stir of northern native political awareness, noted earlier, also worked to promulgate a new relationship with archaeologists and the beginnings of increasingly sensitive programs and practices (Rowley

2002). Arctic archaeologists began to wrestle with long-held approaches and beliefs, and to recognize that their focus on the “pristine” cultures of the distant past were of less interest to local indigenous communities than the more complex and entangled archaeological record of contact and the contact-traditional period (Arnold 1983; Loring 2001; Trigger 1980:662). Much attention was also focused on documenting changing patterns of land and resource use, which in turn fuelled land-claims efforts (Cournoyea 1997; Freeman 1976).

Demands of northern communities would ultimately lead to regulatory and legislative changes (next section), but many southern researchers also worked diligently to cultivate new relationships and approaches to research. Beginning in the 1970s, the Arctic Institute of North America, Inuit Heritage Trust, and Prince of Wales Northern Heritage Centre fostered widespread programs of participatory research (e.g., Kassam and Tetley 2003; Robinson 1996; Rowley 2002). More recently, organizations such as the Smithsonian Institution’s Arctic Studies Center (e.g., Crowell et al. 2001; Fienup-Riordan and Rearden 2005; Fitzhugh et al. 2009; Loring et al. 2003), Avataq Cultural Institute (see below), and the Greenland National Museum (Thorleifsen 2009) have developed concerted programs of community outreach revolving around archaeology education, repatriation, and making collections available to Alaska Native, Nunavik, and Greenlandic Inuit communities. The Canadian Circumpolar Institute, ArcticNet, and other northern research organizations have focused on building broad networks for interdisciplinary circumpolar research and have placed priority on the direct involvement of northerners in research and the training of northern researchers (including both those who reside in the north and those with an interest in the north).

LAND CLAIMS, REPATRIATION, AND THE REGULATORY ENVIRONMENT

Bruce Trigger (1984) long ago advised that archaeological practice is influenced by factors internal to both the discipline and its growth, and by the wider social milieu in which it is practiced. In recent decades, archaeological method and theory have experienced a phase of rapid development in reaction to events within and outside of the discipline. Externally, this growth can partly be attributed to the rise of anticolonial sentiments and concomitant indigenous rights movements (cf. Freire 1970). Internally, these challenges caused a faction of the discipline to undergo a period of sharp reflection and critique concerning the role of archaeologists in studying and representing other cultures (cf. McGuire 2008; Trigger 2008).

Different circumstances led to variability in the timing, pursuit, and settlement of claims across the north. The Alaska Native Claims Settlement Act (ANCSA) of 1971 was part of an expedient program by the government of Alaska to extinguish tribal rights and

replace them with a corporate structure and funding model (Arnold 1978). This model was later amended after sustained protest from Alaska Native groups (Berger 1985; Dombrowski 2001). In much of the Canadian Arctic, by contrast, claims have resulted from a combination of agitation by indigenous communities and federal legislative resolve, particularly following the Calder case (1973), which found that Aboriginal rights remained largely unextinguished in Canada (Tennant 1990:219–221). This legislative resolve was bolstered by the growing strength and lobby of the Inuit Circumpolar Conference (Peterson 1984). The Home Rule Act of 1979 set Greenland on a course for independence from Denmark, which was established in 2009.

Heritage resources would find an increasingly prominent place in the negotiation of land claims, as northern communities gained greater awareness of the stakes of the culture heritage industry. ANCSA established twelve Native-owned regional corporations that each retained the right “to obtain title to historic and archaeological sites within their regions that will remain off-limits to development” (Hollowell 2004:65). Under Home Rule, the government of Greenland adopted responsibility for museums and ancient cultural heritage (Thorleifsen 2009). Northern Canadian claims generally recognize the cultural, spiritual, and educational significance of heritage resources, and place considerable emphasis on the role of communities in researching, curating, and managing archaeological sites and materials (Andrews et al. 1997:241; NLCA 1993:226). Outcomes of these new mandates include the creation and revision of heritage legislation, the development of comanagement plans for archaeological and animal resources, the evolution of community-responsive systems for permitting, and a legislated mandate for ethical and collaborative research (Andrews et al 1997; Canadian Archaeological Association 2000; Webster and Bennett 1997).

The passage of the National Museum of the American Indian Act (1989) and the Native American Graves Protection and Repatriation Act (NAGPRA, 1990) in the United States was followed in Canada and Greenland by policy initiatives that rested on the ethical onus to repatriate. These mandates have given communities greater control over the physical remains of their ancestors, allowing them decision-making powers that were formerly entirely within the discretion of federal governments (Arnold 1992:7). Repatriation policy and legislation have gone some distance toward reconciling the relationships between northern communities and respective governmental institutions with regard to their heritage resources. These communities suffered historically from such practices as the measuring of skulls (of the living and the dead), disinterring of graves, and the removal of both artifacts and ancestors (e.g., Hrdlička 1944), that led many to develop a serious distrust and suspicion of archaeologists (Blondin-Andrew 1997; Haakanson 2010). The effects of such practices were popularized in accounts such as *Give Me My Father's Body: The Life of Minik, the New York Eskimo* (Harper 1986).

Repatriation legislation and policy led to the return of nearly 1,000 ancestors to the Koniag of Western Alaska in 1987 (Bray and Killion 1994:5–6; Crowell et al. 2001:95), 184 individuals from the Late Thule or historic period to Iñupiat of the Alaskan North Slope in 2006 (Loring 2008:190–191), and 30 historic individuals to the Inuit

of Repulse Bay in 1991 (Arnold 1992). This movement has also facilitated greater access of distant and foreign collections to northern communities, and precipitated museum visits and workshops to repatriate knowledge, such as the well-publicized visit of Yupik Elders to the Jacobsen Collection at the Ethnologisches Museum in Berlin (Fienup-Riordan and Rearden 2005; Meade et al. 2005; also Hennessy et al. 2013; Lyons et al. 2012).

Despite these successes, many aspects of repatriation policies could do with improvement in the eyes of communities and archaeologists involved in the process. Under NAGPRA, for instance, repatriation discussions are generally limited to those areas specified by the legislation (including human remains, funerary objects, sacred materials, and items of cultural patrimony), while the sharing of knowledge and resources concerning other realms of material culture is rare and limited (Sullivan et al. 2000). Stephen Loring (2008:190–193), a museum anthropologist with the Smithsonian's Arctic Studies Center, observes that the Smithsonian Repatriation Office's criteria for repatriation have required proof of lineal descent and shown unequal treatment of oral and archaeological testimony, leaving some communities frustrated by the demands of the process and the burden of proof required to bring their ancestors home. While repatriation legislation has helped to level the "interpretive playing field" in some respects (Loring 2008:185), the reigning ideology in archaeological circles—that the material record is the province of all humanity—is questioned by many indigenous peoples, including northerners (Hollowell 2006:86–87).

Whatever the shortcomings of the new regulatory environment—for either archaeologists or community researchers—the net effect across the North American Arctic is a mandate toward greater responsiveness to community needs. The pervasiveness of the "duty to consult" has shifted the practice of research, both in the social and natural sciences, across the north to such an extent that Inuit Tapiriit Kanatami and Nunavut Research Institute published a guide for researchers in 2007 called *Negotiating Research Relationships with Inuit Communities*. The aim of this guide is to "provide practical advice to assist researchers who plan to work with, or in the vicinity of, Canadian Inuit communities," with its ultimate aim being "to improve the process of negotiating research relationships with Inuit communities in Canada" (ITK and NRI 2007:1). Such a document recognizes the difficulties of fostering relationships between communities and outside researchers, particularly the problems related to finding common ground, power-sharing, speaking a common language (both literally and figuratively), and overcoming a history of neglecting community input on the part of outside researchers (ITK and NRI 2007:2). The document follows on the heels of earlier statements of practice, such as the statements in 1977 of the Inuit Circumpolar Conference (now Inuit Circumpolar Council) related to Inuit sovereignty and governance of cultural heritage (Petersen 1984), the agreement signed between the Greenland National Museum and Archives and the National Museum of Denmark to repatriate primary collections in 1984 (Thorleifsen 2009), and the guidelines on best practices derived from the Ittarnisalirijit Conference on Inuit Archaeology, held in Igloolik in 1994 (Webster and Bennett 1997).

THE ELEMENTS AND EVOLUTION OF COMMUNITY-BASED HERITAGE RESEARCH IN THE NORTH: WHAT DOES ARCHAEOLOGY MEAN TO NATIVE NORTHERNERS?

The rise of community-based heritage research is part of a wider growth in the humanities and social sciences toward more responsible and inclusive practice. Increasing reflexivity fostered by the “critical turn” in the anthropological disciplines in the 1980s generated new methods of relating to cultural “others,” and producing and sharing knowledge about “them” (Preucel and Mrozowski 2010:32). Many young indigenous scholars decided to pursue anthropological careers in order to contribute to both the knowledge bank and identities of their own communities and to generate new perspectives on the anthropological endeavor (see Nicholas 2010). Sven Haakanson Jr. (2010:118), of Alutiiq ancestry, studied anthropology due to “the frustration of being excluded from the interpretive process and watching Alutiiq knowledge leave our community.” He observed the routine process of archaeologists and anthropologists seeking and collecting community members’ words and knowledge, only to have them published in the collector’s name. This net loss gave outsiders control over the knowledge, and was further underwritten by a tacit ideology that cultural insiders were not capable of producing scientific knowledge (Haakanson 2010:117).

Haakanson’s critique is widely shared by indigenous peoples, many of whom have similarly sought to turn the interpretive tables. Changes to archaeological practice were brokered across the north by Elders and other community members, who persuaded archaeologists to consider community goals, questions, and perspectives. This process helped transform northern archaeology into a more hybrid and shared endeavor, one which incorporated place names, traditional knowledge, oral histories, and cultural landscapes into research design (e.g., Greer et al. 2010; Loring 2001). In Greenland, archaeologists started exploring local sources of knowledge and incorporating ethnohistorical accounts into their interpretive frameworks in the 1970s (Gulløv 2002). In Denendeh, ethnoarchaeological projects began routinely documenting and integrating traditional knowledge and place names into research design and outcomes in the 1980s (Greer 1997:148). With passing time, the designs of community-based heritage projects have grown more complex, expanding to include a broader cross-section of community members and interdisciplinary research teams, and a wider set of goals. This work is generally geared toward educating northern youth and communities in the ways of their ancestors in order to negotiate present-day conditions (e.g., Godtfredsen et al. 2009; Loring 2008; Lyons et al. 2010). A closely held assumption is that communities will participate in the direction of the work and hold copyright of the data (Vuntut Gwitchin First Nation and Smith 2009: xiii).

Archaeologists and community researchers across the north recognize the close ties between northern archaeology, oral history, and traditional knowledge. The depth

of Elders' knowledge about past land use and occupancy is informed by the continued ability to practice traditions and by memories of a land-based lifestyle in the not-so-distant past (Greer et al. 2010; Heine et al. 2001; Keith 2004; Lyons 2010; Pokiak 2010). Theoretical frameworks draw on indigenous conceptions of the world, which rely on mythic and "true" stories, family and personal life histories, memories of bush life, and patterns of resource use (e.g., Lyons and Marshall 2014; Stewart et al. 2000). Many of these frameworks equally draw on the strength of the scientific method and several of the hallmarks of processual archaeology, such as middle-range theory, rigorous research design, and analogical reasoning. This is true for the very productive ice patch research conducted by Champagne and Aishihik and neighboring First Nations in the southwestern Yukon Territory, involving the recovery of spectacularly preserved hunting artifacts dating back many thousands of years (Greer et al. 2010; Greer and Strand 2012), as well as for Inupiat Elders and researchers from Point Barrow who developed protocols to excavate and study their ancestors, such as the 800-year-old girl found at Ukkuqsi in the old whaling village of Utqiaġvik (Zimmerman et al. 2000).

Given the present growth of community-based archaeological practice and the greater orientation toward community goals, how do native northerners conceive of outside research and researchers, and, more specifically, archaeology and archaeologists? On the one hand, critique is commonplace. The Inuit Tapiriit Kanatami's guide for researchers (ITK and NRI 2007:2, 4), for example, cites lack of local consultation and involvement in research process, cursory inclusion of local expertise, lack of recognition or compensation, and decontextualization of local knowledge as common sources of complaint. More specific critique is aimed at various parts of the data collection and interpretation process. Frankie Stefansson, grandson of the notorious explorer Vilhjálmur Stefánsson, is well versed in the historic literature of the Western Arctic that archaeologists rely on so heavily. He often debunked as errant vast segments of this knowledge in my interviews with him, and questioned the processes of interpretation and transcription, and the role that southerners have played in the representation of Inuvialuit history (Stefansson in Lyons 2013:72).

On the other hand, many northerners have gained a great deal of enjoyment, knowledge, and awareness through archaeology and their relationships with archaeologists (NB: this includes Frankie Stefansson, who greatly enjoyed his time guiding Richard [Scotty] MacNeish and his wife June Helm in the Western Arctic of the 1950s). Long-running field schools and culture camps across the north engage community goals and interests and immerse northern youth in land-based activities (e.g., Avataq Cultural Institute; Knecht 2003; Rowley 2002). Of his long-term and very successful on-the-land programs in Labrador, Loring (1998, 2001, 2008) consistently notes the connection between the continuing "stubborn independence" of Innu and their spiritual relationships to the land through hunting and land-based activities, including archaeology. Inuvialuk Myrna Pokiak (2010:253) states: "Until my participation in the dig at Cache Point [Northwest Territories], I knew little of my ancestor's way of life, even though I grew up practicing traditions passed down from them . . . I was intrigued by the

thought of Inuvialuit living in sod houses [and] . . . was able to picture the set up of the home after each area was uncovered.”

The archaeological record undoubtedly has deep meaning for northerners, who have continued to live and subsist on their lands for centuries and sometimes millennia. The tradition of research also has deep roots in communities that have always had resident community historians, and that have long observed and engaged with the resources of the land, including the archaeological record. Knowledge of family and community history is closely tied to knowledge of survival (e.g., Beardy and Coutts 1996; Lyons et al. 2010; Thorpe et al. 2001). Jack Anawak (1996:648) asserts:

As an Inuk I have learned first-hand that the knowledge handed down by my people on survival in our land is not to be disregarded, and failure to practice and uphold this wisdom can only result in tragedy or disharmony to an individual or group. We, as Inuit, have a strong sense of self—of who we are, and why we are as we are. Although our north is changing, and at times we select those things that are of use to us that stem from other cultures, we maintain to ourselves that which is passed on to us and will be passed on by us.

Inuvialuit, Iñupiat, Dene, Innu, Alutiiq, Yupik, Inuit, Cree, and other native northerners speak to the strength they draw from the history and language of their people (e.g., Bennett and Rowley 2004; Crowell et al. 2001). These communities view their historical narratives and material histories not as a secondary pursuit to more utilitarian concerns, but as a central and identity-constituting part of themselves (Lyons 2013:159–160; Thorleifsen 2009). The move toward greater self-representation is repeatedly seen across the north, and has deep import for northern communities. Representation takes the form of artwork, documentary, digital applications, curriculum, community history, theater, literature, and other forms of expression. Haakanson (2010:120) emphasizes:

What anyone writes and thinks about Native histories will eventually impact the course of history in a region, and that knowledge is greatly influenced by who the writer is. My experience as a Native in the anthropological field has taught me to keep an open mind with everyone I work with, Native and non-Native alike, but also to make sure our voices and the interpretation of our histories are heard and not forgotten.

NORTHERN COMMUNITY ENGAGEMENT AND THE RE/ACTIONS OF THE ARCHAEOLOGICAL COMMUNITY

Both the idea and the practice of community-based archaeology are decades old in the North American Arctic. While present legislation, policy, and ethical positions of

archaeological, governmental, and private-sector organizations are guided by the ethos of consultation and “working together,” changes are generally slower and more stochastic on the ground. It is therefore useful to trace the genealogies of community-based practice in the north via the actions and reactions of Arctic archaeologists to the changing perceptions and practice of community engagement.

The critical turn of the 1980s led archaeologists to an array of new theoretical positions that sought to unpack the biases of longstanding paradigms and to generate new angles into the past (Trigger 2008). Anthropological writing became more narrative, personal, and experimental in hopes of finding a tempered subjectivity that recognized the inherent bias of an author’s perspective (Clifford 1988; Wylie 2006). As elsewhere, these challenges to the scientific method were met with some reserve amongst many Arctic archaeologists (Hood 2002). Arnold (1983) recognized this paradigm shift and perceived that the direct historical approach might be readily applied in the north. He suggested that archaeologists refocus on the contact period at the expense of studies of deeper prehistory. The implications of his suggestion are clear: that engaging with the closer past requires engaging with living communities, a much messier and more involved pursuit than the traditional arm’s-length distance from communities, and their respective pasts.

By the early 1990s, policy changes were directly affecting the research pursuits of archaeologists across the north. The “permitting crisis” in the eastern Arctic in 1992 curtailed many excavation projects and brought to light the serious nature of new policies, the platform of critique that they stood on, and the changes required of archaeologists to operate in the new environment (Helmer and LeMoine 2002). This crisis was brought on by legislative changes associated with the establishment of Nunavut, and required that archaeologists pay greater heed to the planning and execution of research “in ways that are understandable and acceptable to the Inuit community” (Arnold 1992:7).

Most archaeologists chose a pragmatic middle ground through the unfolding research environment, jumping what permitting hoops they must to continue their research, while others have engendered resistance at the removal of their traditional autonomy and the idea of placing equal weight on indigenous explanations of the past (McGhee 2004b, 2008). Others, as outlined in preceding sections, recognized the great benefit to be found in partnering with communities to explore the archaeological record, and its connections to local histories and other forms of data and knowledge still resident in the communities. A number of Arctic archaeologists have written about the reflexive turn their methodological approaches to both archaeology and community relationships have taken as part of collaborative research projects (e.g., Arnold 1992; Crowell et al. 2001; Friesen 2002; McGhee 2004b; Whitridge 2004).

A major venture in community-based archaeologies is engaging with the process of making archaeological knowledge more interesting, usable, and relevant to contemporary communities. Julie Hollowell (2004, 2006) has followed the ethical question of who has the right to control and profit from subsistence digging on St. Lawrence Island, Alaska. She has developed a multistranded framework for understanding the historical contingencies of this situation and its outcomes at both the local and global scale. Brendan Griebel took up residence in Cambridge Bay, Nunavut, to best serve his

archaeological practice, which has sought to develop more community-appropriate methods of conducting, processing, sharing, and delivering archaeological knowledge in Inuit communities (Griebel 2010, 2013). My own work in the Inuvialuit community of the Canadian Western Arctic seeks to develop a theoretical approach and program for practicing archaeology from Inuvialuit perspectives. To this end, I have worked with Elders and other community members to formulate a localized critical theory that would situate Inuvialuit material culture within a context of Inuvialuit history and ways of knowing (Lyons 2011, 2013, 2014).

It is reasonable to ask what progress archaeologists have made within this milieu of intensive community engagement, and what has changed in the decades since the policy and legislative mandates shifted so dramatically. One area of ongoing debate lies with the interpretive process of archaeology and issues around who “holds the pen” (cf. Haakanson 2010; Hodgetts 2013). Multivocality is a laudable goal but one that is difficult to achieve given that most research results are written in either technical summaries or academic articles that are generally inaccessible (either through their language or their circles of publication) to northern community members. The shift toward presenting results through various digital applications has considerable promise (see below). From a theoretical standpoint, archaeologists in the Arctic and elsewhere remain divided on the question of whether oral histories and other sources of indigenous knowledge can and should stand on the same interpretive footing as scientific knowledge (e.g., Colwell-Chanthaphonh and Ferguson 2010; Echo-Hawk 2000; Gulløv 2002; Mason 2007; McGhee 2008). My perspective sides with Trigger (2008:190), who assessed that no “specific group should be accorded an exclusive right to control interpretation of their own past,” and further, “that [not] all narratives are of equal historical value.” Both Western science and indigenous epistemologies employ methods for vetting competing narratives and can often be used to great effect together (e.g., Lyons et al. 2010; Nagy 2006).

One significant outcome of the turn in northern archaeological practice is the greater amount of time, flexibility, and accommodation required to conduct research. The curtailment of researchers’ autonomy has brought together once-distant bedfellows, which on occasion has had transformative and unexpected results. Research of all stripes is remaking its appearance as more of a segmented process, involving the seeking of approval of local communities and negotiating of conditions and questions of research. These things take time and effort and must be considered part of a participatory research process, rather than preliminaries to be dispensed with (Kemmis and McTaggart 2005:563). Rigney (2003) underscores the importance of developing “culturally safe” research practices, meaning those that develop a foundation of trust between partners, and which respect the concerns and perspectives of individual communities (and see Lyons 2011). Preucel and Mrozowski (2010:32–33) have recently characterized the turn in archaeological research from the perspective of theoretical pragmatism (*sensu* Baert 2005; Habermas 1984, 1989). They position contemporary archaeological research as part of an open and evolving dialogue, and endorse the value of knowing one’s own position, and its relation to broader conversations, within the research process (Preucel and Mrozowski 2010: 33; also Wylie 2000).

DISCUSSION AND PROSPECTS

Archaeology in the North American Arctic has transformed from the roots up. Community-based approaches to archaeology are now widespread, in part due to their inclusion in legislation and policy. The trend toward greater community collaboration and partnership appears to be the wave of the foreseeable future. It is endorsed by the mandates of primary funders, such as the Social Sciences and Humanities Council of Canada and the Arctic Social Sciences Program of the US National Science Foundation, who are increasingly requiring proof of community consultation and wider public outreach.

The increased involvement of native northerners has blurred the lines of *who* constitutes an archaeologist and *what* constitutes archaeological knowledge. These are critical and widely discussed trends in the discipline (e.g., Lyons 2013; Lyons et al. 2010; McGhee 2008, 2010; Mason 2007; Wilcox 2010; Wylie 2000). Questions surrounding both the nature and the production of archaeological knowledge are far from resolved; in fact, a period of lively debate is likely ahead of us, as new varieties of archaeological practice evolve in communities across the Arctic. Northern indigenous communities have long held the notion that archaeology is just one component of the larger heritage enterprise, which can and should combine a variety of data sources, from oral histories to genealogies, stories, songs, and archaeological data. From a methodological standpoint, it appears that excavation is being displaced as the primary *modus operandi* of Arctic archaeology by an expanding suite of data sources and analyses.

The impact of “new media” now factors heavily into emergent forms of archaeological practice and its research outcomes and deliverables in the north. Digital applications are generating new communication possibilities between geographically distant collaborators. Collections are now commonly digitized for online viewing and commentary by northern communities and researchers alike (SILA, <http://www.sila.nu/>). Many of these forums are interactive, permitting discussion and debate about specific items of material culture, the issues surrounding their interpretation, and other questions of interest and concern (Rowley et al. 2010). These types of applications permit new kinds of connections between communities and their material collections, which are usually housed in distant museums across North America and Europe. They create digital access, greater awareness, and opportunities for digital and knowledge repatriation (Hennessy et al. 2013).

The hybrid and flexible nature of web-based applications also provides ever-increasing ways to produce, present, and communicate archaeological knowledge. Peter Dawson and colleagues have demonstrated the utility of virtual reality to bring archaeological features, artifacts, and landscapes to life and to attract northern youth by creating games that depict immersive and coherent scenes and sounds of past eras (Dawson et al. 2011). The great diversity of content available on the websites of northern museums and heritage organizations is already used heavily by communities and educators

across the north (e.g., Arctic Studies Center, <http://www.mnh.si.edu/arctic/index.html>; Avataq Cultural Institute, <http://www.avataq.qc.ca/en/Home>; Inuit Heritage Trust, <http://www.ihti.ca/eng/home-english.html>; Prince of Wales Northern Heritage Centre, <http://pwnhc.learnnet.nt.ca/>); the very availability of this knowledge permits a much greater awareness of northern histories by northern youth. At the other end of the production spectrum, Vuntut Gwich'in First Nation has been video-documenting their joint archaeological excavations and culture technology camps and converting this footage into pedagogical tools for the community (Vuntut Gwitchin First Nation and Smith 2009). Arctic geographer Gita Laidler has created a website with portals of interest to both the communities she works with and the researchers with whom she communicates (Straight Up North, http://www.straightupnorth.ca/Sikuliriji/SUN_Home.html). Archaeologist Matthew Walls has created a trilingual website that showcases his community-based inquiry into Inuit kayak hunting in Greenland (Frozen Landscapes, Dynamic Technologies: Inuit Kayak Hunting and the Perception of the Environment in Greenland, <http://www.qajaq.utoronto.ca/index.html>).

Whatever methods are adopted in community-based partnerships, the relative success of such projects may be measured through the longevity of these relationships and the satisfaction of respective partners (Lyons 2011, 2013). Specific criteria for crafting and maintaining a successful project can generally be characterized by a set of guiding “best” practices. While a number of published references concerning participatory research and community-based practice are available (e.g. Atalay 2012; Tuhiwai Smith 1999; Watkins and Ferguson 2005), the following elements of a negotiated research relationship are drawn from Lyons (2013) and Inuit Tapiriit Kanatami (2008:7–8). These include: setting your intentions and the scope of your project appropriately; taking the time to mutually develop ground rules for communication, informed consent, conflict resolution, and copyright; practicing with honesty, flexibility, patience, openness, trust, and a willingness to learn and try new things; educating, hiring, and purchasing locally; giving recognition, reporting back, and generating community-appropriate deliverables.

It is evident that research relationships between northern indigenous communities and archaeologists exist along a broad spectrum within these parameters, from full collaborative practice to a more consultative role, depending on various contingencies, choices, and the research questions at hand. The primary foundation of such relationships is respect, from which trust can grow. The question of advocacy and “how close is too close” consistently appears in the literature surrounding applied anthropology (and archaeology), with the dangers of relativism being heavily expounded (for different viewpoints, see McGhee 2008; Trigger 2008; Wylie 2006). However, there are many examples of sound and effective community-based projects that rest on a tempered or situated advocacy, where the relationship is negotiated to provide partners with their relative needs (publications, copyright, data access and/or control, etc.). It is well to remember that relationship building, in the archaeological world and elsewhere, takes time, practice, and patience, and that conscious, informed choices pave each step of the way.

CONCLUSIONS

This chapter has traced the evolving relationships between archaeologists and indigenous communities across the North American Arctic. It has described elements of community-based practice in archaeology, and illustrated some of the forms, applications, and outcomes of this research. Northern native communities have always been interested in their foundational stories, histories, and material culture, and have continually asserted the connections between many disparate sources of knowledge, as they inform past and present identities. While the focus of collaborative projects with archaeologists has largely been on the recent past, which is populated by known and remembered individuals, the more distant past, and the scientific theories and oral traditions that support this knowledge, are also of great interest to northern communities.

Engaging in successful community-based archaeology requires placing divergent sets of goals on the table and negotiating a research design that can accommodate all partners. Such an approach, which brings conventional archaeology clearly into the province of participatory research, obliges archaeologists to expand their traditional suite of both theoretical and methodological practices. Effective community-based research is powerful, engaging, and transformative, qualities that are instrumental for making contemporary archaeology socially relevant.

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PART II

.....
WESTERN ARCTIC
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CHAPTER 9

FIRST TRACES

Late Pleistocene Human Settlement of the Arctic

TED GOEBEL AND BEN A. POTTER

INTRODUCTION

THE global dispersal of early modern humans during the late Ice Age is a principal chapter in the history of our species, and the colonization of the far north was a pivotal step in “getting humans everywhere.” Success in the bitterly cold, open, and unpredictable Arctic and Subarctic required not only novel, innovative technologies—for example, reliable hunting weapons, substantial artificial shelters, and tailored, insulated clothing—but also complex long-distance social networks and flexible settlement strategies (Hoffecker 2005; Soffer 1994).

Scientific research chronicling early human settlement of the far north has focused primarily on northern Asia and Beringia, because during the late Pleistocene these areas were largely ice-free, while most of Scandinavia, Canada, and Greenland were covered by ice sheets and glaciers. Despite more than 50 years of research, however, Pleistocene archaeology in the region is still in a nascent state, mainly because of its remoteness. Much of the Bering land bridge is now submerged under the Bering and Chukchi seas, and those areas that are above sea level in northern Russia, Alaska, and northwestern Canada are for the most part inaccessible except by helicopter or small boat. Deeply buried Paleolithic sites, moreover, often occur in deeply buried frozen contexts and under dense boreal forest or shrub-tundra vegetation, making their discovery and investigation difficult. Despite these barriers, a few sites are known that suggest humans first colonized the Arctic by 30 thousand calendar years ago (kya), and many more are known that date to the terminal Pleistocene, between 14 and 12 kya, especially in Alaska. Here we synthesize this record and provide a Paleolithic context for the remainder of Arctic prehistory presented in this volume.

PALEOCLIMATIC FRAMEWORK

Our story begins ~40–30 kya, when anatomically modern *Homo sapiens* first colonized Europe and northern Asia (Hoffecker 2005). Conditions in northern Asia around this time were relatively warm (so warm that Russian paleoecologists refer to this period as the Karga interglacial), but starting ~28 kya, climate deteriorated, culminating with the last glacial maximum (LGM) 24–22.5 kya. Despite the existence of the Bering land bridge during this time, eastern Beringia became separated from the rest of North America by the expansion of ice sheets and glacier complexes in Canada (Clague et al. 2004; Kaufman and Manley 2004) (Figure 9.1). Northern Asia and Alaska, however, remained largely glacier-free during the LGM (Brigham-Grette et al. 2004). Climate was cold and dry, and environments were largely open and treeless, with variable steppe-tundra and shrub-tundra vegetation communities (Ager and Phillips 2008; Elias and Crocker 2008; Hoffecker and Elias 2007; Kuzmina et al. 2008). This tundra-steppe biome supported large-mammal populations, including woolly rhinoceros (*Coelodonta antiquitatus*), horse (*Equus caballus*), steppe bison (*Bison priscus*), and mammoth (*Mammuthus primigenius*) (Guthrie 2006; Lorenzen et al. 2011).

Soon after 22.5 kya, northern climates began to warm and glaciers melt (e.g., Dyke 2004), but not steadily (e.g., Menviel et al. 2011). Significant warming occurred during the Bølling interstadial, ca. 14.7 kya, and in some records this was followed by a brief cold period, the Older Dryas stadial, ca. 14 kya. Relatively warm conditions returned by 13.8 kya, with the onset of the Allerød interstadial. Shrub-tundra communities expanded during this time (Ager and Phillips 2008; Anderson et al. 2004; Hoffecker and Elias 2007), and trees soon followed, with larch (*Larix*) woodlands dispersing across Asian Beringia (Lozhkin et al. 1993) and groves of balsam poplar (*Populus*) appearing in interior Alaska (Brubaker et al. 2005). The disappearance of horse, woolly rhinoceros, mammoth, and saiga antelope (*Saiga tatarica*) from Beringian landscapes may have been a product of these changes (Guthrie 2003; Lorenzen et al. 2011); however, caribou (*Rangifer tarandus*), bison, and Dall sheep (*Ovis dalli*) survived, and wapiti (or red deer, *Cervus elaphus* or *C. canadensis*) appeared for the first time in Alaska. Another noteworthy change was gradual flooding of the Bering land bridge by 12.4–11.3 kya (Hoffecker and Elias 2007).

The Allerød was interrupted 12.9 kya by the last cold episode of the Pleistocene, the Younger Dryas stade, which in global-climate records persisted for 1,300 years (Rasmussen et al. 2006). The effects of the Younger Dryas in northern Asia and Alaska appear to have been variable, with some proxy records indicating substantial cooling and drying, and others, persisting warm climate (Graf and Bigelow 2011; Kokorowski et al. 2008).

The end of the Younger Dryas ~11.6 kya marks the onset of Holocene warming, culminating with a “thermal maximum” in Alaska by 11.5–11 kya (Kaufman et al. 2004). The spread of balsam poplar beyond the modern Arctic treeline, thawing of ice wedges, and widespread development of soils together suggest warmer temperatures than even

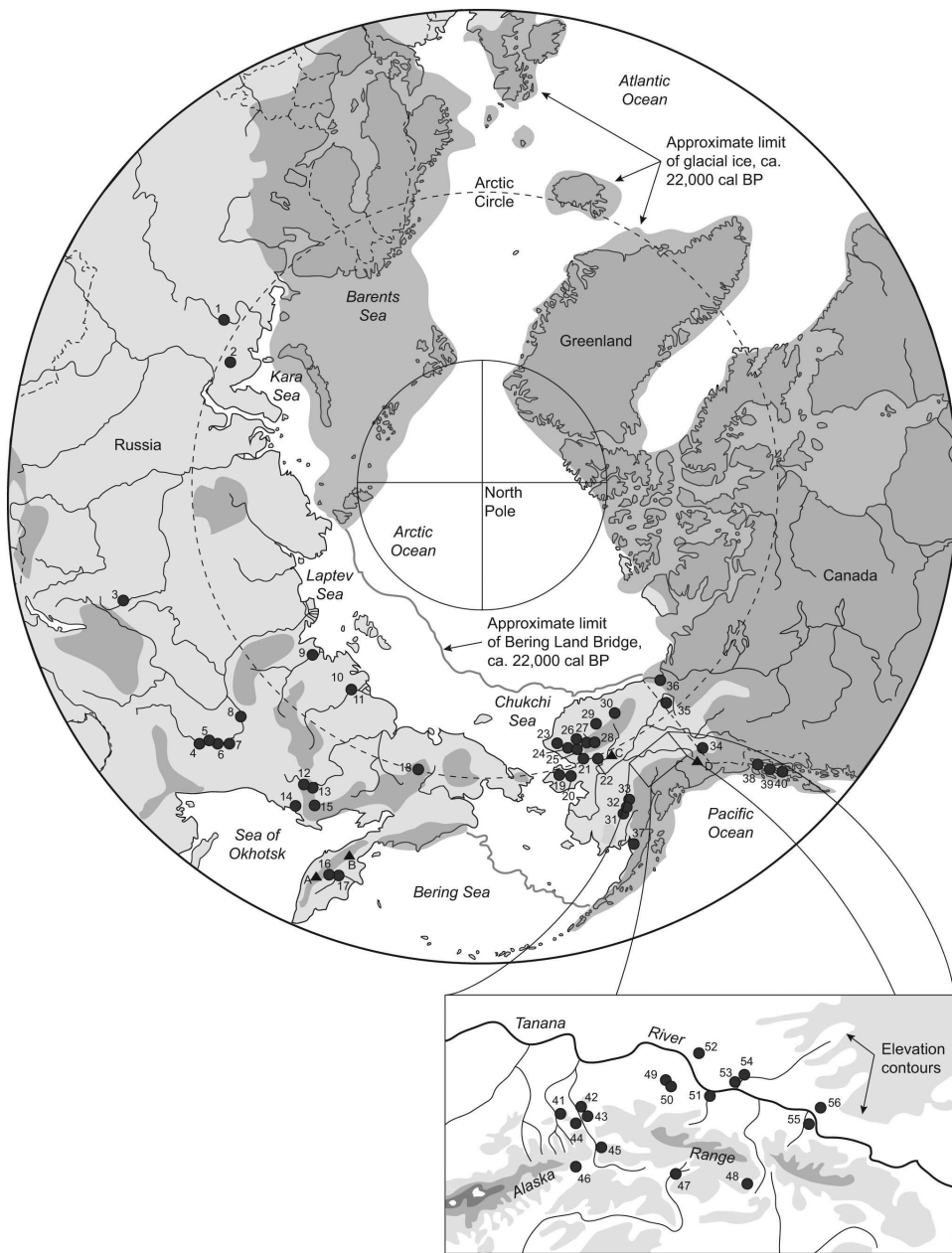


FIGURE 9.1 Map showing locations of important archaeological sites (circles) and obsidian sources (triangles) mentioned in text: (1) Byzovaia; (2) Mamontovaia Kuria; (3) Nepa-1; 4, Diuktai Cave; (5) Ust'-Mil'-2; (6) Verkhne Troitskaia; (7) Ezhantsy; (8) Ikhine-2; (9) Yana RHS; (10) Berelekh; (11) Achchagyi-Allaikha (paleontological site); (12) Siberdik; (13) Kongo; (14) Uptar; (15) Khaia; (16) Anavgai-2; (17) Ushki; (18) Tytyl'vaam; (19) Serpentine Hot Springs; (20) Trail Creek Caves; (21) Onion Portage; (22) Nogahabara; (23) Raven Bluff; (24) Tuluaq Hill; (25) NR-5; (26) Caribou Crossing; (27) Nat Pass; (28) Sluiceway; (29) Mesa; (30) Putu/Bedwell/Hilltop; (31) Spein Mountain; (32) Ilnuk; (33) Lime Hills Cave; (34) Little John; (35) Bluefish Caves; (36) Engigstciak; (37) Graveyard Point; (38) Groundhog Bay; (39) Hidden Falls; (40) On-Your-Knees Cave; (41) Owl Ridge; (42) Moose Creek; (43) Walker Road; (44) Dry Creek; (45) Carlo Creek; (46) Bull River-2; (47) HEA-454; (48) Tangle Lakes sites (Phipps, Whitmore Ridge, Sparks); (49) FAI-2077; 50, FAI-2019/FAI-2043; (51) Upward Sun River; (52), Chugwater; (53) Broken Mammoth/Mead; (54) Swan Point; (55) Gerstle River Quarry; (56) Healy Lake Village/Linda's Point; (A) KAM-05/KAM-07; (B) KAM-03; (C) Batza Téna; (D) Wiki Peak.

Drawing by Ted Goebel

today. A final important change to the northern landscape was the spread of spruce (*Picea*) across northwestern Canada and Alaska by 10 kya or shortly thereafter (e.g., Anderson et al. 2011).

EARLIEST INHABITANTS OF THE FAR NORTH (42–30 KA)

The earliest evidence of humans in far northern Eurasia, above 60°N latitude, coincides with the relatively warm mid-Upper Pleistocene, or Karga interglacial. In the Pechora River basin of far northeastern Europe, stone artifacts and faunal remains have been recovered from two sites, Mamontovaia Kuria and Byzovaia; however, in both cases, cultural layers were in coarse-grained fluvial cobble beds and likely redeposited. Mamontovaia Kuria yielded two possible stone tools and five flakes loosely associated with remains of extinct fauna, including a worked mammoth tusk; radiocarbon ages suggest an age of 42 kya (Pavlov et al. 2004). At nearby Byzovaia, a lithic assemblage of scrapers, backed knives, and bifaces dates to about 10,000 years later, ~32 kya (Pavlov et al. 2004). Associated faunal remains are dominated by bones of mammoth. Although some of the bones could be the product of human hunting, more likely they resulted from natural mammoth deaths, with humans scavenging the remains for raw material in tool manufacturing (Pavlov et al. 2004).

In Siberia, the earliest far northern Paleolithic sites are roughly the same age as Byzovaia. One of these is Nepa-1, located along the Nizhnaia Tunguska River. Although only minimally tested, Nepa-1 has yielded a small assemblage of stone artifacts (including a bipolar core and several flakes) found in a buried soil sealed by more than 2 meters of silts and sands (Sëmin and Shelkovaia 1991). Associated with the artifacts were remains of horse, woolly rhinoceros, auroch (*Bos primigenius*), and Siberian roe deer (*Capreolus capreolus*), two of which have been AMS radiocarbon (¹⁴C) dated to before 30 kya (Goebel 2004). A cluster of early sites also occurs along the Aldan River (Mochanov 1977). The oldest of these seems to be Ikhine-2, which contains multiple cultural layers dating to 34–31 kya, where an excavated area exceeding 215 m² yielded only ~20 inexpressive stone artifacts and ~200 bones of large mammals (mammoth, woolly rhinoceros, bison, horse, reindeer, red deer, and moose [*Alces alces*]) and carnivores (wolf [*Canis* sp.], Arctic fox [*Vulpes lagopus*], and fox [*Vulpes vulpes*]) (Mochanov 1977). Like the Pechoran sites, these remains may be redeposited (Goebel 2004).

The Yana RHS site demonstrates humans dispersed into western Beringia before the onset of the LGM. This site, located above the Arctic Circle along the lower Yana River (Figure 9.2), contains a well-preserved cultural layer in a deeply buried, frozen alluvial context. Recent thawing and erosion exposed numerous artifacts and animal bones on the beach in front of the site (Pitulko et al. 2004), among them a beveled projectile fore-shaft carved from the horn of a woolly rhinoceros directly ¹⁴C dated to 32.2 kya (Pitulko



FIGURE 9.2 View of the Yana RHS site, with archaeologist Vladimir Pitul'ko in foreground.

Photo courtesy of Vladimir Pitul'ko

et al. 2004). This, together with 34 other ^{14}C dates, indicates an age of 33–31 kya for the Yana cultural layer (Pitulko and Pavlova 2010). Early occupants produced a unique stone-tool assemblage primarily based on simple core-and-flake and discoidal cores and unifacial retouching of flakes into side scrapers, points, burins, and wedge-like tools (Pitulko and Pavlova 2010). Blades are rare and microblades absent. Mammoth-ivory and bone awls as well as split longbones presumably used as wedges speak to the importance of osseous material for the production of tools (Pitulko and Pavlova 2010). Many of these display ornamental incisions, and numerous beads and bead preforms are signs of art and bodily ornamentation (Pitulko et al. 2012). Subsistence at Yana RHS focused on bison, reindeer, horse, and hare (*Lepus* sp.); at one locus more than 1,000 mammoth bones representing at least 26 individuals have been recovered (Basilyan et al. 2011). A diverse array of other fauna—woolly rhinoceros, musk-ox (*Ovibos moschatus*), red deer, moose, wolf, brown bear (*Ursus arctos*), fox, wolverine (*Gulo gulo*), and beaver (*Castor* sp.)—round out the assemblage, indicating diverse subsistence activities including the taking of some animals for their furs (Pitulko and Pavlova 2010). The density and extent of finds indicate that Yana represents a sustained, long-term settlement of Arctic north-western Beringia.

Whether humans persisted in the Asian Arctic and Beringia through the LGM is an open question, because no other archaeological site has yet been found in the far north that dates between the time of Yana RHS (~32 kya) and the terminal Pleistocene (~14–12 kya). In the Yukon, Canada, early bone artifacts once argued to date to the onset of the

LGM (Irving and Harington 1973) are now interpreted to either date to the Holocene (Nelson et al. 1986) or not be artifacts at all, but naturally broken bones (Thorson and Guthrie 1984). Only the refitting mammoth-bone core and flakes from Bluefish Caves, directly ^{14}C dated to ~28 kya (Cinq-Mars and Morlan 1999; Morlan 2003), remain as possible evidence of pre-LGM humans in eastern Beringia, but even these could be of natural origin (Wilson and Burns 1999). Put simply, after Yana RHS, the earliest unequivocal signs of humans in the Eurasian far north date to after the LGM, in Beringia no earlier than 14 kya.

LATE-GLACIAL BERINGIA (14–12 KYA)

Chronology and Colonization

In Interior Alaska at least 30 precisely dated cultural occupations ranging from ~14 to 10 kya have been found (Figure 9.3). These archaeological sites are concentrated in the Tanana River basin, primarily in the middle Tanana valley (near Delta Junction) and middle Nenana valley (near Healy). Typically they occur in deeply buried (up to 2.5 m), well-stratified deposits of wind-blown silt (loess) and sand, and geochronologies are based on reliable radiocarbon dates from wood charcoal or bone clearly of cultural origin. Many sites (for example Swan Point, Broken Mammoth, Mead, Dry Creek, Owl Ridge, Upward Sun River, Moose Creek, and Gerstle River Quarry) contain multiple stratified cultural occupations, facilitating precise studies of human behavioral change across the Pleistocene-Holocene boundary.

The earliest occupation known in central Alaska is cultural zone 4 at Swan Point, dated to ~14.4–13.6 kya. Its contents include a microblade industry and remains of extinct and extant faunal species from a sealed deposit of loess, ~75 cm below the modern surface (Holmes 2011). Little John, located in the uppermost Tanana basin in southwest Yukon, Canada, may also contain a cultural occupation dating to nearly 14 kya, but this is based on a small assemblage of lithic artifacts in possible association with a dated bison bone (Easton et al. 2011). After this, cultural occupations from 12 sites document the existence of humans in the Tanana and Nenana valleys between ~13.8 and 13 kya (recent reviews include Graf and Bigelow 2011; Potter 2011; Wygal 2011) (Figure 9.3). These sites clearly date to the Allerød interstadial, a relatively warm period of the late glacial when some of the earliest shrubs and possibly even trees dispersed into the region. Occupations postdating this period and falling within the time frame of the Younger Dryas are fewer in number but apparent at several Tanana basin sites (i.e., FAI-2043, Moose Creek, Mead, Broken Mammoth, Upward Sun River, and possibly FAI-2077, XBD-308, and XBD-338) (Graf and Bigelow 2011; Potter 2008, 2011; Wygal 2011). Some of the extensive component-2 occupation at Dry Creek and Chindadn levels at Healy Lake may also date to this “cold snap,” but the numerous artifact concentrations there have not been directly dated with radiocarbon samples of cultural origin

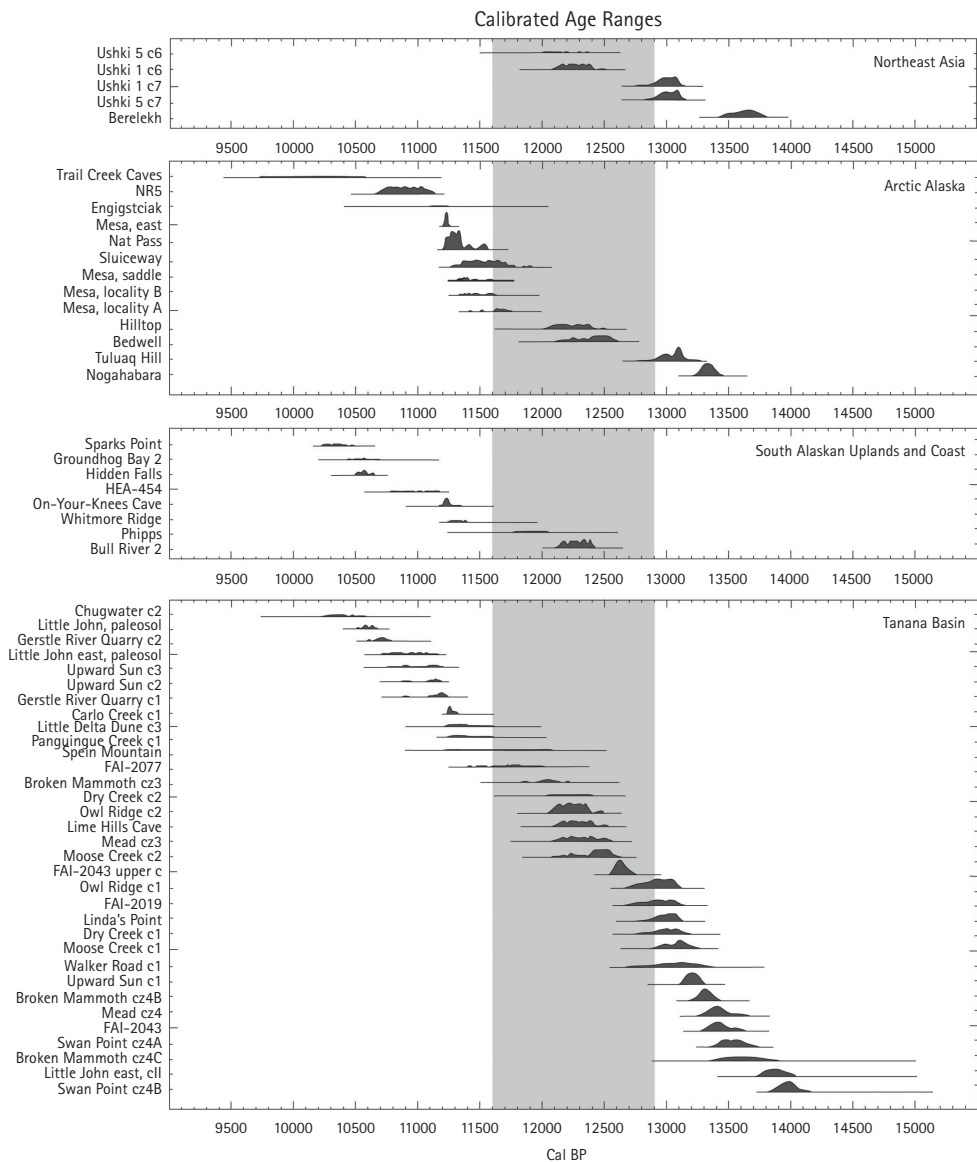


FIGURE 9.3 Calibrated radiocarbon ages for Beringian archaeological sites of the terminal Pleistocene and earliest Holocene.

Drawing by Ted Goebel

(Cook 1996; Powers et al. 1983). Outside the Tanana basin, other interior Alaskan sites contain Younger Dryas occupations, most notably Lime Hills Cave and possibly Spein Mountain (Ackerman 2001, 2011). The earliest Holocene, 11.6–11 kya, is better represented in central Alaska: at least 11 cultural components document continued human occupation.

South of the Alaska Range in southern Alaska, early cultural occupations are comparatively few in number. Bull River 2, located in the Nenana-Chulitna divide area of the south Alaska Range, may date to 12.5–12 kya (Wygall 2010), but this site has received limited testing. Other south Alaska Range sites (e.g., HEA-454 along the uppermost Susitna River and Phipps, Whitmore Ridge, and Sparks Point in the Tangle Lakes vicinity) appear to date to latest Younger Dryas or post-Younger Dryas times (Blong 2012; West et al. 1996a, 1996b, 1996c), potentially indicating an initial pulse of upland human activity as postglacial climates warmed significantly. Several archaeological sites in southeast Alaska (and western coast of Canada) suggest a similarly aged dispersal of humans into Alaska's southern maritime regions (Ackerman 1996; Dixon 1999; Fedje and Mathewes 2005).

Ten sites document the existence of late Pleistocene humans in north and northwest Alaska. The oldest, Tuluq Hill, located in the western Brooks Range, yielded a hearth feature consistently dated to 13.2–13 kya, indicating the presence of humans in Alaska's Arctic during the late Allerød interstadial (Rasic 2011). Other early sites, typically rich in lanceolate bifacial points, including Bedwell, Hilltop, Sluiceway, Nat Pass, and NR5 (Rasic 2011; Reanier 1995), appear to have been occupied during or soon after the Younger Dryas, as do the numerous hearth features and artifact concentrations atop the Mesa site (Kunz and Reanier 1995). Engigstciak and Trail Creek Caves may contain early Holocene occupations (Cinq-Mars et al. 1991; Larsen 1968), but their radiocarbon chronologies are imprecise or equivocal. Similarly, Nogahabara yielded lithic artifacts and faunal remains ^{14}C dated to 13.7–12.8 kya from a sand-dune blow-out (Odess and Rasic 2007), but these could not be reliably associated, meaning that some, if not all, of the artifacts could be much younger than the bone, an interpretation that explains the rather late-appearing notched bifacial points in the assemblage (Holmes et al. 2008).

A recent chronological development has been the dating of northern Alaska's fluted-point complex. Although long known from more than 20 surface or near-surface sites that could not be reliably dated (Clark 1991), fluted points were recently recovered from two buried sites in northwest Alaska—Serpentine Hot Springs and Raven Bluff (Goebel et al. 2013; Hedman et al. 2011). At both they appear to date to ~12 kya.

In western Beringia, humans were once thought to have occupied the Ushki sites in Kamchatka by 18–16.5 kya (Dikov 1977 [2003]), but more recent work at Ushki-1 and Ushki-5 demonstrates their basal cultural component (layer 7) dates to only ~13 kya (Goebel et al. 2003). Berelekh, therefore, is the earliest well-documented late-glacial occupation of western Beringia: Arctic hare bones directly associated with human-produced artifacts repeatedly date to ~13.8–13.5 kya (Pitulko and Pavlova 2010). Younger Dryas-aged occupations have also been found at the Ushki sites (layer 6) (Dikov 1977 [2003]; Goebel et al. 2003) and Anavgai-2 (Ptashinski 2009) (both located in central Kamchatka), while post-Younger Dryas occupations have been found at Kongo, Siberdik, Uptar, and Tytyl'-vaam in interior western Beringia, just to name a few (Slobodin 2011).

Raw-Material Procurement

Although few studies of lithic raw-material procurement have been completed in the Beringian region, during the last decade significant developments have been made, primarily through the application of geochemical techniques to define the provenance of obsidian artifacts.

Pioneering geochemical work by Griffin et al. (1969), Clark (1972), and Cook (1995) demonstrated that numerous Alaskan sources of obsidian were used in prehistory. Early work used neutron activation analysis (NAA), a destructive technique, while more recent studies have focused on nondestructive X-ray fluorescence (XRF) analysis (Reuther et al. 2011). To date, 32 obsidian groups have been identified in the archaeological assemblages of Alaska, but for most of these, physical sources remain unknown (Reuther et al. 2011). For example, the earliest cultural occupation at Swan Point contains obsidian from unknown “Group H” (Reuther et al. 2011). Notable known sources include Batza Téna, located in the middle Koyukuk River basin of interior northwest Alaska (Clark and McFadyen Clark 1993), and Wiki Peak, located in the northern Wrangell Mountains near the Alaska-Yukon border (Figure 9.1) (Cook 1995). Both Batza Téna and Wiki Peak obsidians occur in the earliest lithic assemblages of central Alaska—Wiki Peak at Walker Road, Broken Mammoth, and Little John; Batza Téna at Dry Creek (component 2) and Swan Point (cultural zone 3); and both at Moose Creek and Healy Lake (Goebel 2011; Reuther et al. 2011). Batza Téna obsidian is even more common in early northwest Alaskan assemblages, for example Tuluq Hill, Nogahabara, and Mesa. Distances between these sources and sites are typically on the order of hundreds of kilometers. Walker Road and Moose Creek, for example, are ~350 km from Wiki Peak, while Healy Lake and Tuluq Hill are ~450–500 km from Batza Téna. Even in southeast Alaska, the region’s earliest assemblages have obsidians demonstrating boat transport between the mainland and islands (Lee 2001). Obviously Alaska’s late Pleistocene inhabitants were well informed about the locations of high-quality tool stones and transported them great distances, but we still do not know whether these patterns represent high mobility or long-distance trade networks.

XRF analyses in Kamchatka have identified similar patterns of obsidian procurement. Numerous obsidian sources have been distinguished in association with the region’s many volcanos (Glascok et al. 2006), and the peninsula’s earliest known human occupation, layer 7 at Ushki-1, contains at least six of them, three known, called KAM-03, KAM-05, and KAM-07, which come from different locations in the Sredinnyi mountain range, ~200 km from Ushki (Figure 1) (Kuzmin et al. 2008). Two others (KAM-01 and KAM-10) are suspected to have come from ~300 km south, near the modern city of Petropavlovsk-Kamchatsky (Kuzmin et al. 2008). Layer 6 at Ushki has a similar yet less diverse suite of obsidians. The Ushki obsidian artifacts lack cortex, suggesting that these tool stones were initially worked directly at sources and transported to Ushki as prepared cores or preforms (Kuzmin et al. 2008). Like in Alaska, the diversity and distances

between Ushki and its obsidian sources suggest the development of complex procurement strategies early in prehistory.

Procurement of other tool stones in Beringia is less well understood. In the Nenana valley, however, analyses of Nenana complex assemblages suggest they were founded largely on procurement of local raw materials like chert, chalcedony, quartzite, and rhyolite, to create expedient stone tools, while later Denali complex assemblages were sometimes based on exotic raw materials that arrived at sites as formal cores and tools (Goebel 2011; Graf and Goebel 2009). This may suggest fundamental differences in land use between earliest and later occupants of the Nenana valley, but in the middle Tanana valley, this does not seem to be the case—toolstone procurement and use at Mead (CZ4 and CZ3) did not vary (Little 2013). In northwest Alaska, geochemical analysis of cherts has identified at least four recognizable “quarry fields” where early humans procured tool stone that they transported to nearby sites like Onion Portage and Caribou Crossing (Malyk-Selivanova et al. 1998; Rasic 2011). Based on these data, lithic-conveyance zones and settlement systems can be interpreted, but as Malyk-Selivanova et al. (1998) caution, regional databases of as many sources as possible are required. One thing is for certain, however: by the earliest known occupations, Beringians had already acquired detailed knowledge of their lithic landscapes.

Lithic and Osseous Technology

Early northern technologies focused on stone and osseous materials like bone, antler, and ivory, with multiple types of weapon tips evident. A few early Beringian assemblages contain slotted osseous projectile points presumably inset with microblades. At Lime Hills Cave 1 in interior southwest Alaska, fragments of three bilaterally grooved antler points were recovered, two directly dated to ~12.2–9.7 kya (Ackerman 2011). At the nearby Ilnuk site, a medial fragment of a grooved antler point was also found but not dated (Ackerman 2011), and at Trail Creek Cave 2, Seward Peninsula, five nearly complete slotted antler points were recovered in association with bone conventionally ¹⁴C dated to ~10.3 kya (Larsen 1968). These inset osseous points likely functioned as dart or spear points and/or knives (Hare et al. 2004; Zenin et al. 2003), though they have also been postulated to have served as arrow points (Ackerman 2011; Dixon 2011), graters or awls (Ackerman 1985), or saws (Yi and Clark 1985). Numerous Beringian sites contain microblade cores and microblades, indirect evidence that slotted projectile points were frequently used during the terminal Pleistocene and early Holocene throughout the region (Potter 2011). Among these is the earliest site yet known from Alaska—Swan Point—where microblades occur in deposits securely dated to ~14 kya (Holmes 2011). Other early microblade sites occur in central Alaska (e.g., Dry Creek component 2, Phipps), northwest Alaska (Onion Portage), southwest Alaska (Graveyard Point), interior Chukotka (Khaia, Kongo, Siberdik), and Kamchatka (Ushki layer 6), indicating the widespread use of this projectile technology well into the Holocene.

Nonslotted osseous projectile technologies also occur. At Broken Mammoth, these are represented by a cache of three ivory artifacts—two points and one possible atlatl handle (Holmes 1996; Yesner 1994, 1996)—as well as a carved and decorated bone rod broken into three sections, potentially representing a complex atlatl dart (Yesner et al. 2000). A bone needle from Broken Mammoth and additional fragments of worked ivory from this site as well as Swan Point, Mead, Berelekh, and Gerstle River indicate the importance of osseous materials for the production of tools during the late Pleistocene and early Holocene in Beringia.

Stone bifacial points are also common across Beringia, but they vary greatly across space and time. In central Alaska, after Swan Point the earliest sites typically contain small stone points made on flakes and shaped into triangular or teardrop-shaped forms, often called “Chindadn points.” In the Nenana complex sites of the Nenana valley, for example, teardrop-shaped points have been recovered from Walker Road (Goebel et al. 1996), triangular points from Dry Creek (Powers and Hoffecker 1989), and both from Moose Creek (Pearson 1999) (Figure 9.4). These are small and thin, typically made on flakes and incompletely worked on both faces. At Walker Road, conjoining basal and tip fragments of two teardrop-shaped points were found around the same hearth features (Goebel et al. 1996), suggesting their use as hand-held knives; while at Dry Creek, two of three triangular points were just basal fragments (Powers and Hoffecker 1989), suggesting they functioned as projectiles. Chindadn points also occur in Younger Dryas-aged occupations at Broken Mammoth and Swan Point (Holmes 1996, 2001, 2011; Holmes et al. 1996), as well as at Healy Lake, where they were first described (Cook 1969), and at Little John and Chugwater (Easton et al. 2011; Lively 1996). The western Beringian sites Berelekh and possibly Ushki layer 7 have yielded teardrop-shaped points similar to Chindadn forms; at both sites they seem to date to ~13.5–13 kya (Goebel and Slobodin 1999; Pitulko 2011). At Ushki, however, most of layer 7’s small bifacial projectiles are stemmed and shouldered (Dikov 1977 [2003]; Goebel et al. 2003). The widespread occurrence of Chindadn points in the terminal Pleistocene occupations of Beringia indicates they represent a unique *fossile directeur* of early Beringians.

Central Alaskan assemblages typically ascribed to the Denali complex often contain lanceolate-shaped bifaces, larger than Chindadn bifaces and frequently in association with microblades (Powers and Hoffecker 1989; West 1981). These stone points were typically manufactured from large bifacial preforms and secondarily flaked to midlines, creating thick lenticular or diamond-shaped cross sections. They have straight to convex bases and long downwardly contracting “stems,” lack obvious shoulders, and are widest nearer the tip than the base. Many basal fragments display impact fractures (Powers et al. 1983), suggesting their use as weapon tips, and at Upward Sun River, convex-based lanceolate points were recovered in a burial pit with decorated bibeveled antler fore-shafts (Potter et al. 2014).

In northern Alaska, early period bifacial points are distinctive and often characterized as “Paleoindian” (Smith et al. 2013). Most obvious are the northern fluted points found at sites like Putu, Batza Téna, and Serpentine Hot Springs (Clark 1991; Goebel et al. 2013). These typically have deeply concave, sometimes V-shaped bases, multiple

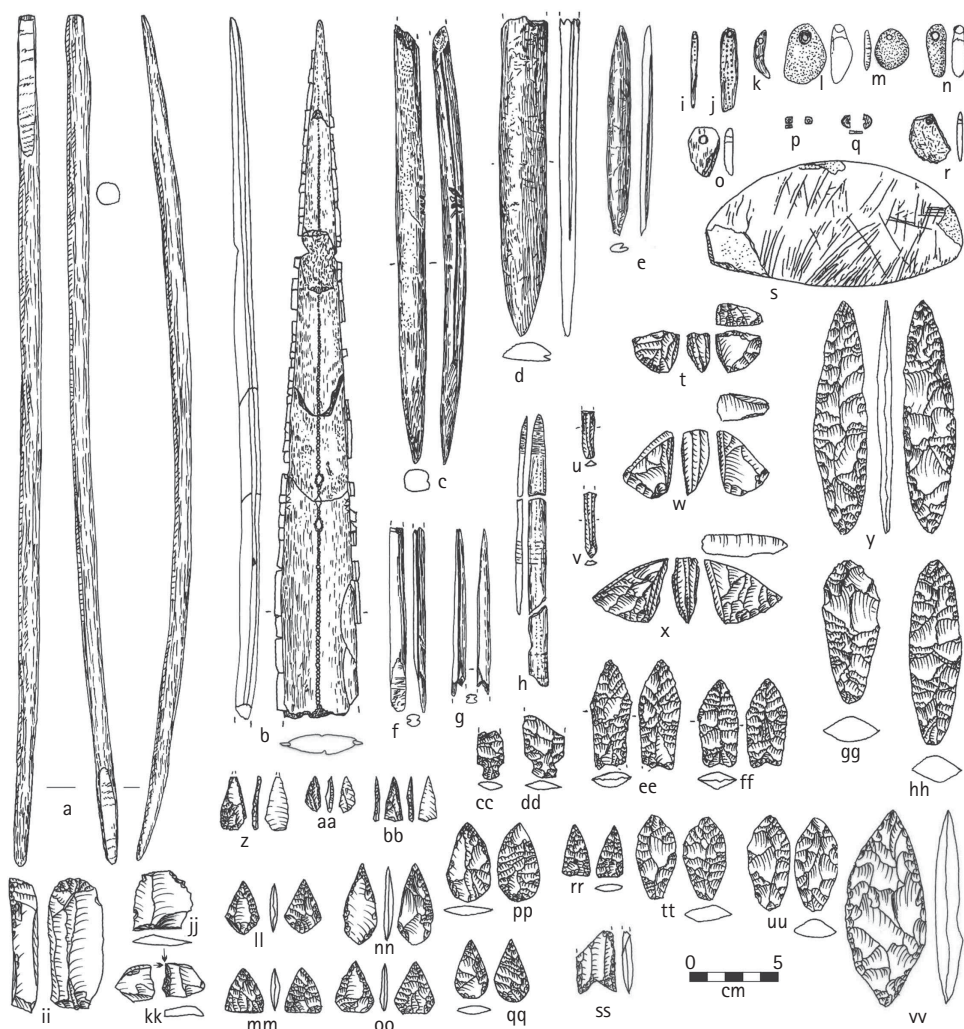


FIGURE 9.4 Northern Paleolithic artifacts referred to in text. (a) Woolly rhinoceros fore-shaft: Yana RHS; (b) osseous inset point with microblades: Chernoozer'e-2; (c) osseous inset point: Tashtyk-2; (d–e) osseous inset points: Kokorevo-1; (f–g) osseous inset points: Trail Creek Caves-2; (h) ivory foreshaft: Broken Mammoth; (i) osseous eyed needle: Yana RHS; (j) osseous diadem: Yana RHS; (k) tooth pendant, Yana RHS; (l–n) stone pendants: Berelekh; (o) stone pendant: Khaia; (p–q) stone beads: Ushki-5; (r) stone pendant: Uptar; (s) stone tablet with incisions interpreted to represent huts: Ushki-1; (t) wedge-shaped microblade core: Dry Creek; (u–v) microblades: Ushki-5; (w) wedge-shaped microblade core: Swan Point; (x) wedge-shaped microblade core: Diuktai Cave; (y) biface: Diuktai Cave; (z, aa, bb) backed points: Yana RHS; (cc–dd) bifacial stemmed points: Ushki-5; (ee–ff) bifacial Mesa lanceolate points: Mesa; (gg) bifacial Sluiceway point: Caribou Crossing; (hh) bifacial Sluiceway point: Upper Kelly site; (ii) end scraper: Kokorevo-1; (jj) flake graver: Mesa; (kk) burin: Dry Creek; (ll–oo) bifacial Chindadn points: Healy Lake Village; (pp–qq) bifacial Chindadn points: Walker Road; (rr) bifacial triangular point: Dry Creek; (ss) bifacial fluted point: Serpentine Hot Springs; (tt–uu) bifacial lanceolate points: Dry Creek; (vv) biface: Byzovaia

Sources: (a, z–bb) Pitulko and Pavlova 2010; (b) Petrin 1986; (c–e, ii) Abramova et al. 1991; (f–g) Larsen 1968; (h) Yesner et al. 2000; (i–k) Pitulko et al. 2012; (l–n, x–y) Mochanov 1977; (o, r) Slobodin 2011; (p–q, u–v, cc–dd) Goebel et al. 2003; (s) Dikov 1977; (t, kk, pp–rr, tt–uu) Goebel et al. 1991; (w) Holmes 2011; (ee–ff, jj) Kunz and Reanier 1994; (gg–hh) Rasic 2011; (ll–oo) Cook 1996; (ss) this volume; (vv) Boriskovskii 1984. Drawings by Ted Goebel

flutes on both faces, and edge-ground proximal margins, features suggestive of affinities with late Paleoindian industries of temperate North America, not surprising given their presumed ~12 kya ages at Serpentine and Raven Bluff. Another northern Alaskan point form, Mesa, is distinct from northern fluted points in that it has a shallow concave base, is basally thinned but not fluted, and has proximal lateral margins that contract downward (Kunz and Reanier 1995), features common on nonfluted late Paleoindian projectile points in temperate North America (e.g., Goshen/Plainview). Sluiceway points of northwest Alaska also fit the northern Paleoindian pattern. These points are large and long, lanceolate-shaped with excurvate, edge-ground bases, and have thick, biconvex cross sections (Rasic 2011). Many have impact fractures, indicating their use as projectile tips, and many show signs of resharpening and recycling, an indication of differential land-use intensity in the Brooks Range and its foothills (Rasic 2011).

Besides projectile tips, studies of tool technology in late-glacial Beringia have focused on other bifacial tools, unifacial tools, cores, and debitage. In central Alaska, the few comprehensive technological studies that have been conducted suggest the use of a combination of informal and formal technologies. Nenana complex industries of the Allerød interstadial, on the one hand, are characteristically informal, being based on simply prepared flake and blade cores, with tool assemblages being dominated by marginally worked unifacial tools (Goebel 2011; Graf and Goebel 2009). Even bifaces are uncommon and often just bimarginally or invasively retouched. Denali complex industries of the Younger Dryas stade, on the other hand, contain higher frequencies of formal cores (e.g., wedge-shaped microblade cores) and tools that are either carefully designed (e.g., microblades for use in composite projectiles, burins, and hafted bifacial points) or intensively reduced (e.g., side scrapers and cobble tools) (Graf and Goebel 2009). Burins are especially common in early central Alaskan assemblages, and they seem to most frequently co-occur with microblades, leading to the inference that they were used to trim, carve, and incise hard osseous materials (Powers et al. 1983). In northern Alaska, Paleoindian industries often have small, marginally worked tools like graters and end scrapers, but these were often made on biface-thinning flakes (Kunz and Reanier 1995), by-products of a formal technology. The Sluiceway complex of northwest Alaska is characterized by similar flake tools as well as bend-break tools on broken bifaces (Rasic 2011). Burins are rare or absent in the northern Paleoindian assemblages, a further sign of a reliance on well-designed stone projectile points instead of inset osseous points.

Early Beringians obviously left behind a diverse array of artifacts and assemblages in their sites, and this variability is expressed not just in their projectile technologies but also in the manners in which they procured raw materials, prepared cores, and manufactured hafted and unhafted tools. Explaining this technological variability is a daunting task, one that has been debated by archaeologists for decades (Goebel and Buvit 2011), with some explaining it in terms of normative cultural differences (e.g., Dixon 2001; Dumond 2011; Hoffecker 2011; Hoffecker et al. 1993; Kunz and Reanier 1995; Slobodin 2011), others in terms of behavioral differences (Bever 2001; Graf and Bigelow 2011; Holmes 2001; Potter 2011; Rasic 2011; West 1996).

Subsistence Economy

Economic patterns among late Pleistocene eastern Beringian colonizers and later populations adapting to oscillating climatic conditions are difficult to establish. Taphonomic factors within the modern boreal forest act to inhibit organic preservation, with birds and fish potentially being underrepresented in the faunal record. High residential-mobility strategies likely employed would have yielded relatively ephemeral sites (Kelly and Todd 1988; Powers et al. 1983). Work over the last 20 years in eastern Beringia, however, has yielded significant patterning of early economic strategies and subsistence patterns. Several middle and upper Tanana valley sites (especially Broken Mammoth, Swan Point, Mead, Upward Sun River, Little John, and Gerstle River) have produced multiple components before, during, and after the Younger Dryas with substantial faunal preservation (e.g., Easton et al. 2011; Holmes 1996, 2011; Potter 2007; Potter et al. 2011a, 2011b; Yesner 2001, 2007; Yesner et al. 2011).

The debate regarding early Paleoindian subsistence strategies is sometimes dichotomized as (1) large-mammal specialization and (2) broad-spectrum generalization (Grayson and Meltzer 2003; Waguespack and Surovell 2003; see review in Scott 2010), with some explaining variability in terms of logistical organization, resource scheduling, and seasonality (Potter et al. 2011b), local microenvironments (Yesner et al. 2011), or climate change (Graf and Bigelow 2011; Mason et al. 2001). The eastern Beringian data for the Allerød come from sites in the Tanana basin (and none elsewhere), specifically Dry Creek, Broken Mammoth, Swan Point, Mead, Upward Sun River, and Little John (Holmes 2011; Holmes et al. 1996; Powers et al. 1983; Potter et al. 2011a; Yesner 1996, 2001; Yesner et al. 2011). These sites contain varying frequencies of large ungulates, primarily steppe bison and wapiti, but low frequencies of moose, caribou, and Dall sheep. Other important taxa include waterfowl (including swan and ducks), other birds (e.g., ptarmigan [*Lagopus lagopus*]), and small mammals, notably hare and ground squirrel.

Terminal Pleistocene (Younger Dryas) occupations at Broken Mammoth, Swan Point, Mead, and Upward Sun River include much the same suite of resources, but with the notable reduction in avian remains and addition of salmonid fish (at Upward Sun River and Broken Mammoth) (Potter et al. 2011b; Yesner 2001). Two additional sites in northwest Alaska (Raven Bluff and Serpentine Hot Springs) are notably different from the central Alaskan data, in that they have yielded small-sized ungulate remains, specifically caribou at Raven Bluff, associated with fluted points (Goebel et al. 2013; Hedman et al. 2011). While some have argued for bison as the economic mainstay of northern Paleoindian sites (e.g., Kunz et al. 2003; Loy and Dixon 1998), paleontological data indicate regional extinction of bison in northwest Alaska by the end of the Pleistocene (Rasic and Matheus 2007). Moreover, the archaeological data suggest caribou was a more important resource. The implications of these new findings have not yet been incorporated into economic models, but they suggest considerable regional economic variability during the Younger Dryas.

Post-Younger Dryas occupations with fauna between 11.5–9 kya (Dry Creek component 2, Gerstle River components 1–3 and 5, Little John, Healy Lake Village, and Carlo

Creek) indicate continued exploitation of large ungulates (bison and wapiti), small game, particularly hare, and to a much lesser extent, avians (Bowers 1980; Cook 1996; Easton et al. 2011; Potter 2007; Powers et al. 1983). Caribou is uncommon in these assemblages (except Little John) and does not become a substantial element in central Alaskan diets until after 6 kya, when vegetation and fire-regime changes may have reduced bison habitat (Mason and Bigelow 2008; Potter 2008).

While these data are coarse grained and subject to varying interpretations, some tentative conclusions can be drawn. There is no indication that late Pleistocene or early Holocene eastern Beringian foragers practiced strictly megafaunal specialization or broad-spectrum foraging strategies, but rather complex strategies exploiting predictable resources that varied seasonally (Potter et al. 2011b) and regionally (Yesner et al. 2011). Data from contemporaneous sites indicate seasonal differences in procurement (Bowers 1980; Potter 2007), even controlling for local environment (e.g., Broken Mammoth cultural zones 3 and 4; Yesner 2001). Excluding the earliest Swan Point occupation, intersite analyses in central Alaska indicate that overall there appears to be little difference in economy before, during, or after the Younger Dryas. Instead, the first major economic transition occurred in the middle Holocene, when caribou replaced bison and wapiti as the major ungulate resource (Potter 2008).

Direct data on western Beringian subsistence economies are rare. From Ushki-1 layer 7, a moose antler fragment was recovered (Goebel and Slobodin 1999), and from Ushki-1 layer 6, Vereshchagin (1979) reported steppe bison, mountain sheep (*Ovis nivicola*), horse, lemming (*Lemmus* or *Dicrostonyx* sp.), and a deliberately buried dog (*Canis familiaris*), while Dikov (1990) added birds (possibly duck) and fish (possibly salmon). At Berelekh, remains of extinct hare (*Lepus tanaiticus*) and various birds dominate the assemblage, while mammoth, rhinoceros, bison, reindeer, horse, musk-ox, and cave lion (*Panthera* sp.) are minimally represented (Mochanov 1977; Vereshchagin 1979). The mammoth, rhinoceros, and cave-lion remains may have been scavenged from a nearby “mammoth cemetery,” or may be intrusive (Pitulko 2011).

The extent and nature of mammoth exploitation in Beringia has been a matter of some debate (see review in Hoffecker and Elias 2007). In northwest Beringia, mammoth-bone accumulations at the Berelekh and Achchagiyi-Allaikha sites are not temporally associated with human occupations (Pitulko 2011; Nikolskiy et al. 2010). However, recent work at a mammoth locality (YMAM) near the Yana RHS site indicates anthropogenic accumulation (Basilyan et al. 2011; but see Pitulko and Nikolskiy 2012:26). Mammoth-tusk fragments are relatively common in eastern Beringian assemblages (e.g., Broken Mammoth, Swan Point, Mead, Gerstle River), but no postcranial remains have been recovered, suggesting scavenging of ivory for tools.

Thus, in the broadest view, an economic focus on gregarious, grazing megafauna (horse, bison, mammoth, and woolly rhino) is evident early in the Upper Paleolithic of western Beringia (i.e., at Ikhtine-2 and Yana RHS), along with evidence for small game exploitation, while in eastern Beringia during the late glacial, horse and mammoth drop out by ~14 kya (perhaps evident only at the earliest known component at Swan Point (Holmes 2011), and bison and wapiti remain the dominant large ungulate prey until ~6

ka, when they are largely replaced by caribou (Potter 2008, 2011). Compared with the earliest Paleoindian assemblages south of the ice sheet, a broader subsistence economy (Waguespack and Surovell 2003) or similarly broad economy (Grayson and Meltzer 2003) is evident in late-glacial Beringia, based on megafauna, medium and small mammals, birds (particularly waterfowl), and, to a lesser extent, fish (probably anadromous), with clear seasonal differences.

Settlement Organization

A general Beringian settlement-system model would be unrealistic given the observed and inferred ecological and physiographic variation throughout this large area; however, regional systems of land use have been conjectured. An early influential settlement model was developed by Guthrie (in Powers et al. 1983) for central Alaska, where archaeologically visible sites like Dry Creek were interpreted to represent “spike camps” where recently acquired game was processed for transport to base camps. Yesner (1996) has argued these base camps may have been preferentially located on valley bottoms, and thus differentially eroded. More recent models include Rasic (2011) and Potter (2011), who posit settlement systems or land-use strategies at various scales for north-western and central Alaska, respectively. In these models, seasonal resource availability and abundance (particularly of caribou and bison) as well as mobility are key elements constraining potential land-use patterns. These models, while useful for regional problems, may not be suitable for extrapolation to regions with less archaeological coverage, particularly western Beringia, where horse and mammoth may have been economically more important. Other Alaskan settlement models focus on specific aspects of technology, for example seasonal constraints on technology (Wygall 2011), or on later time periods (e.g., Mason et al. 2001). Climatic effects on animal and plant distributions have been argued to have altered technology and settlement strategies before, during, and after the Younger Dryas (Graf and Bigelow 2011), though other analyses (Potter 2011) suggest broadly similar subsistence-settlement systems for these periods.

For western Beringia, well-dated stratified sites are rare, but Ushki-1 contains multiple features interpreted by Dikov to represent three types of structures, semisubterranean houses with central rock-lined hearths and entrance tunnels inferred to be winter dwellings, surface houses without entrance tunnels inferred to be contemporaneous summer dwellings, and irregularly shaped charcoal smears inferred to be earlier dwelling structures (Dikov 1977 [2003]). Ushki, however, remains unique in Beringia, and no other dataset suggests such multiseasonal occupations.

Art, Ornamentation, and Ritual

Examples of art and ornamentation are rare in the Arctic’s late Pleistocene and early Holocene archaeological record. Incision marks regularly occur on worked ivory, bone,

and antler tools; however, often these are related to manufacture or use, not decoration. Nonetheless, numerous osseous tools at Yana RHS are ornamented (Pitulko and Pavlova 2010), a fragmented ivory point from Broken Mammoth (cultural zone 3) has patterned incisions suggesting a nonutilitarian, stylistic origin (Yesner et al. 2000), and an antler-point fragment from Lime Hills Cave bears signs of a reddish pigment (Ackerman 2011), suggesting the use of ochre as decoration.

Beads, pendants, and other items of personal adornment have not been recovered from securely dated early contexts in Alaska; however, in western Beringia they are more common. At Yana RHS hundreds of beads and bead preforms have been recovered (Pitulko et al. 2012). At Berelekh, five stone pendants occur on round to oval-shaped pebbles and have biconically drilled holes near one end; two of these display parallel incisions around their perimeters (Mochanov 1977). Raw materials vary and include green jadeite and white calcite. At Ushki, hundreds of small stone beads and a few stone pendants were found, primarily from layer 7 dating to ~13 kya, but also from layer 6, 12.5 kya (Dikov 1977 [2003]). The beads typically are tiny and disk-shaped with biconically drilled holes; most were recovered from a burial pit at Ushki-1, but they also occur in domestic settings preserved at Ushki-1 and Ushki-5 (Dikov 1977 [2003]; Goebel and Slobodin 1999; Goebel et al. 2003). A few labrets were also found in layer 6 at Ushki-1. Stone pendants also have been recovered from presumed early contexts at the Khaia and Uptar sites, both located near Magadan, Russia (Slobodin 2011).

Works of Paleolithic art, so common in Europe and western Siberia, are so far rare from the early record of Beringia. Two possible exceptions are an engraving of a mammoth on a fragment of tusk, found along the Berelekh River by local collectors in 1965 (Mochanov 1977), and a stone slab from Ushki with numerous incisions interpreted to represent conical-shaped huts (Dikov 1977 [2003]).

The near absence of clear signs of ornamentation, artwork, and ritual in Beringia's early archaeological record may be a sign of high levels of mobility among the region's late Pleistocene and early Holocene occupants (Goebel 2002), or it could be due to sampling—an obvious bias toward discovery and investigation of short-term camps and special-task sites instead of long-term settlements or villages. Not surprisingly, when obvious habitation features have been encountered, for example at Yana RHS, Ushki, and Upward Sun River, ornamented artifacts, works of art, and/or ritual features have been unearthed.

Human Remains

There are only two known terminal Pleistocene sites containing human burials in Beringia, consistent with the high mobility and small co-residing population sizes inferred for early populations. The first, Ushki-1, Kamchatka, consists of two such features, the older (layer 7) containing a single adult burial (with only bone outlines preserved) within a rock-lined pit spatially separated from residential structures (Dikov 1977 [2003], 1996). Items within the ochre-filled pit included hundreds of stone beads,

stone cobbles, and a few stone tools. The younger Ushki component (layer 6) yielded two unburned burials of children in small pits within separate houses (Dikov 1979; Slobodin 2006). Items within one of these included ochre, a pendant, numerous lemming incisors, and elements of microblade technology (Dikov 1979, 1996). Layer 6 at Ushki also yielded a dog burial which had been dug into the floor of a house. Some of the bones and surrounding sediment were stained by red ochre, and the burial pit contained an obsidian knife and end scraper, as well as a sandstone plate (Dikov 1979).

The second Beringian burial site is Upward Sun River, in central Alaska (Potter et al. 2011a, 2014). A child of about three years old was cremated and buried in a pit hearth (~45 cm deep) within a residential structure (which was abandoned after the cremation). Dental traits indicate a Sinodont pattern (Potter et al. 2011a). Directly below the child cremation was a second burial, which contained the remains of two infants, four bibeveled antler rods (three with multiple X-shaped incisions), and two lanceolate bifacial points in positions to suggest they had been hafted to the antler rods at the time of burial (Potter et al. 2014). All of the artifacts were ochre-stained. Overlapping ^{14}C ages of ~11.5 kya on the two features suggest they are nearly contemporaneous, both being the product of either the same or successive seasonal occupations (Potter et al. 2014).

CONCLUSIONS

Given the record presented above, we offer the following tentative conclusions about the late Pleistocene settlement of Arctic Asia and America. It is evident more work—from field investigations in areas that have received relatively little attention (for example, the lower Kolyma basin, parts of interior Alaska) to larger, open excavations to evaluate site structure and organization—is necessary to test the many points of debate raised above.

- (1) Initial human colonization of far northeastern Asia occurred by ~32 kya, based on the record from Yana RHS in Arctic western Beringia, as well as from a few scattered sites in the Lena and Nizhnaia Tunguska basins, Subarctic Siberia. Little is known about these early human inhabitants of the Arctic and Subarctic; however, at Yana we know they were full-time residents of the far north who produced an Upper Paleolithic style of material culture and subsisted on a diverse array of fauna, much of it now extinct. At present, there is no clear linkage between these initial Arctic occupants and later populations that colonized the New World.
- (2) Sustained human settlement of Arctic and Subarctic Siberia and Beringia through the last glacial maximum has not been demonstrated. Instead, the data suggest humans reappeared in the region during the late glacial, certainly by 16 kya in Yakutia and 14 kya in Beringia.
- (3) Late Upper Paleolithic humans postdating the last glacial maximum in Siberia typically produced composite weapon tips inset with microblades. The earliest

late-glacial Beringian occupation, dating to 14 kya at Swan Point in central Alaska, also contains evidence of microblade technology.

- (4) After 14 kya, the late-glacial Beringian archaeological record, from Kamchatka to central Alaska, is characterized by diverse projectile-point technologies and forms. Some early industries are northeast Asian in character (i.e., they contain microblade technologies—the Denali and Diuktai complexes), some are North American in character (e.g., the Mesa and fluted-point complexes of northern Alaska), and some are distinctly Beringian in character (e.g., the Ushki layer 7 and Nenana complexes). Archaeologists still do not agree on how to explain this variability, whether it represents cultural or behavioral differences, or some combination of the two.
- (5) Lithic raw-material procurement studies are still emerging, but already they are hinting at complex procurement and transport systems even in the earliest sites of Kamchatka and central Alaska. Without question, their occupants had “mapped onto” the Beringian landscape by 14–13 kya.
- (6) Beringian economies were internally quite diverse, with eastern Beringian populations focusing on bison and wapiti during the terminal Pleistocene and early Holocene. Early Beringian diets also incorporated other large ungulates, small and medium mammals (some furbearing), waterfowl and other birds, and fish.
- (7) Although at Yana RHS the earliest Beringians appear to have regularly subsisted on mammoth, during the late glacial current evidence suggests mammoths were not regularly hunted. Instead humans appear to have scavenged mammoth carcasses or “boneyards” for ivory to be used as tools. This may have important implications for resolving the extent to which human predation and climate change affected these and other late Pleistocene megafauna.
- (8) Late-glacial Beringian settlement organization is more difficult to generalize. Most sites reflect short-term, limited-activity occupations of mobile hunter-gatherers, but two sites, namely Ushki and Upward Sun River, contain evidence of longer-term, potentially multiseason habitations with dwelling and burial features. As our site samples increase and our understanding of land use and organization of space develops, we suspect a more complex picture of Beringian settlement strategies and land use will emerge.
- (9) Items of personal adornment, art, and ritual behavior are relatively rare in the Beringian record. The dearth of mobile art is consistent with the high mobility inferred for these early Beringians; however, the few sites that have yielded such articles in abundance represent habitation sites.

Important questions remain unresolved and suggest avenues for future research. Did modern humans disperse from western Beringia into Alaska before the last glacial maximum, or did they make it no further than Yana RHS? If the latter, what ecological or demographic variables affected this expansion? How is late-glacial lithic-assemblage variability to be interpreted? To what extent did normative and functional/behavioral factors influence this variability? Another major unknown is whether pre-13 kya

archaeological occupations exist on the North American northwest coast, indicating a second migration route into North America. How did early Beringians adapt technology, subsistence, and settlement to the radically changing environments of the north during the late Pleistocene and early Holocene? Did they have a primary role in extirpating certain megafauna? Finally, what role did the early Beringians have in the overall peopling of the Americas south of the Canadian ice sheets? Answers to these questions must await new discoveries as well as the application of new methods and theoretical perspectives that permit an investigation of the adaptive as well as historical components of the human past.

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CHAPTER 10

THE ORIGINS AND DEVELOPMENT OF ARCTIC MARITIME ADAPTATIONS IN THE SUBARCTIC AND ARCTIC PACIFIC

BEN FITZHUGH

ORIGINS OF ARCTIC MARITIME ADAPTATIONS

WHERE, when, and why people first came to utilize coastal resources, travel by boat, and otherwise develop specialized maritime cultures are interesting questions in the evolutionary history of the human species, and understanding how and when this occurred around seasonally frozen coasts is of critical importance to the history of Arctic settlement and adaptation. A key location for this development was in the Subarctic North Pacific, an apparent incubator for maritime hunter-fisher-gatherer adaptations that subsequently expanded into the High Arctic on multiple occasions starting in the mid-Holocene. The purpose of this chapter is to examine the evidence of maritime lifeways and development in the greater North Pacific Rim region (Gulf of Alaska, Bering Sea, Okhotsk Sea, and Chukchi Sea) as a precedent for successful settlement and persistent occupation of the Arctic.

The earliest evidence of coastal occupation and maritime economy in this region is currently situated in the earliest Holocene (Dixon et al. 1997), while indirect evidence points to an earlier coastal migration around the North Pacific no later than about 15,000 years ago (Dillehay 2009; Tamm et al. 2007). In tropical to temperate climates, human aquatic and coastal adaptations are known much farther back

into the Pleistocene and may have been key aspects of *Homo sapiens*, expansion from Africa (Bailey 2010; Erlandson 2001, 2010). Certainly, watercraft are implicated in the colonization of Australia as early as 45,000 and 65,000 B.P. (O'Connell et al. 2010; O'Connor 2010).

Unlike tropical and temperate locations, *subarctic* and *arctic* environments require unique technologies, skills, and strategies to travel, fish, and hunt over always frigid, often frozen, and frequently storm-prone waters. McGrail (2010) argues that maritime travel and subsistence activities would have been constrained in high-latitude contexts—on average those above 40 degrees north or south latitudes—by the risks of thermal exposure. Poleward of these latitudes, people typically need sophisticated technologies to avoid hypothermia, including waterproof and insulated clothing, and boats that are seaworthy and provide protection from the elements. Late Pleistocene *Homo sapiens* certainly had the cognitive capacity to develop such adaptations. Whether they did so prior to the early Holocene remains an open question of relevance to the topic of this chapter.

The earliest archaeological sites in the Americas, genetic analyses and paleoenvironmental evidence from the North Pacific Rim support the hypothesis of boat-assisted migration around the now-submerged coastal fringes of the Beringian North Pacific no later than 15,000 years ago (Dillehay 2009; Goebel et al. 2008; Mandryk et al. 2001; Misarti et al. 2012; Tamm et al. 2007). A logical extension of this hypothesis would have these littoral mariners settling the Subarctic coasts and leaving descendants in their wake, descendants who—if they did not die out or move away—would continue to occupy the North Pacific coastal margins into the Holocene. Persistence of a Pleistocene maritime Subarctic tradition could provide the base on which later Arctic maritime traditions emerged. Alternatively, Pleistocene abandonment of the Subarctic coasts could have left them open for subsequent settlement by later immigrants and the history underlying human settlement of the High Arctic may have a more recent maritime foundation.

Sites on islands and those including faunal assemblages with marine taxa are used to estimate the antiquity of the earliest and increasingly intensive maritime investments in the North Pacific. In the pages that follow, I consider the relationship between the earliest maritime archaeological record and (1) the proposed Beringian refugia and coastal route for Paleoindian migrations into the Americas, and (2) terminal Pleistocene settlers of interior Beringia. Exploring the cultural ancestries of the earliest maritime archaeological record provides an opportunity then to examine the subsequent development of Subarctic and Arctic maritime adaptations. The Holocene archaeological record paints a dynamic picture of Subarctic adaptations involving the expansion of coastal settlement into new regions, the development of intensive maritime economies and the growth of increasingly complex sociopolitics.

This chapter starts with a brief review of the North Pacific archaeological evidence. Patterns revealed in this review are then considered in light of several possible explanations related to (1) archaeological sampling and preservation, (2) relationships of earliest archaeological maritime evidence to the original Pleistocene migrations to

the Americas, (3) environmental dynamics, and (4) the growth of intensified political-economic interactions.

Due to space constraints, the focus of this review is on coastal archaeology, and addresses the archaeological record of interior zones and adaptations only as it relates to interpretations of coastal developments. The archaeology of the Subarctic and Arctic interior is less well developed than that of the coastal regions, and expanded study of near-coastal interior zones could significantly clarify coastal-interior dynamics and the question of developing maritime adaptations examined here.

THE EVIDENCE

This review of archaeological information is divided into three geographic regions: the Subarctic Northeast Pacific, capturing the greater Gulf of Alaska from the Aleutians to the Southeast Alaska panhandle; the Subarctic Northwest Pacific, including the Sea of Okhotsk north to the Gulf of Anadyr; and what I am calling the Arctic Pacific region, including the coasts of Chukotka, Northwest Alaska, and the Eastern Bering Sea north of Bristol Bay (Figure 10.1). Each region differs ecologically as a result of the combined effects of latitude, topography, oceanic currents, climate, and weather patterns, though the boundaries between regions have been set primarily for convenience of description.

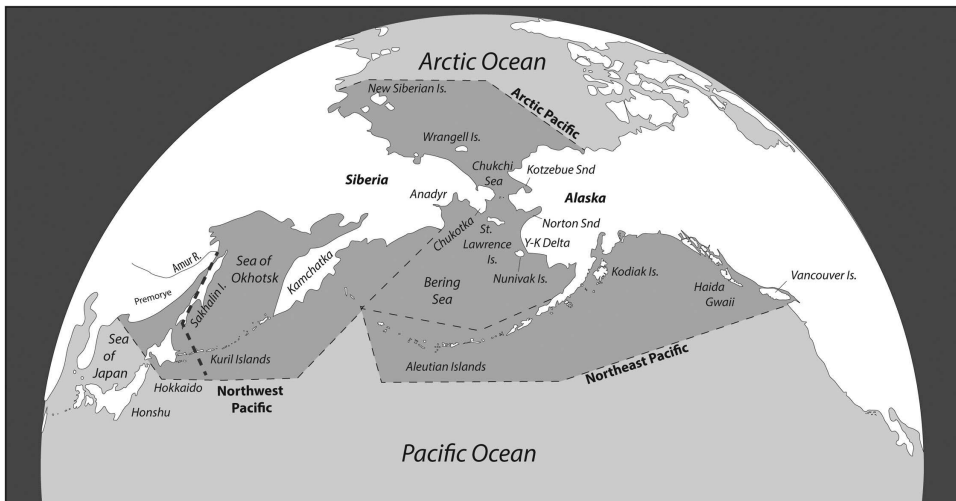


FIGURE 10.1 Map of the North Pacific showing locations discussed in the text and macroregions used to organize this review. Thick dashed line indicates separation between southern Northwest Pacific and northern Northwest Pacific, discussed in the text. Illustration by the author from a Google Earth projection.

Northeast Pacific

For the purposes of this chapter, the Subarctic Northeast Pacific includes the coast from British Columbia to the Aleutians. While largely south of the distribution of seasonal sea ice, this region has the oldest archaeological evidence for maritime activities of the three regions considered. British Columbian and Southeast Alaskan coastal archaeology reaches back to about 12,000–12,500 cal B.P. with scattered evidence accumulating for the next 3,000 years (Baichtal and Carlson 2010; Erlandson et al. 2008; Fedje and Mathewes 2005). Some of these sites are on landforms that required boat access (e.g., Davis 1989), and obsidian found at some sites indicates long-distance trade requiring watercraft (Moss 1998). Biogeochemical analysis of a human jaw at On-Your-Knees Cave suggests a predominantly marine diet by 11,000 cal B.P. (Dixon et al. 1997), while the oldest archaeological marine fauna (shellfish and near-shore bottomfish) are recovered from the Chuck Lake site (9,000 cal B.P.: Moss 1998). These Northeast Pacific coastal sites fit into a broader pattern of early Holocene maritime adaptations supporting the use of boats, fishhooks, nets, and barbed points (perhaps not harpoons), and diets including fish and shellfish (Ames 1998).

The earliest archaeological manifestation of maritime living on the Bering Sea is found in the Eastern Aleutians in sites of the Anangula tradition beginning around 9,000 cal B.P. Anangula tradition assemblages are now known from several locations (Dumond and Knecht 2001; Knecht and Davis 2001). Lacking organics, marine diets are assumed from the paucity of terrestrial resources expected for that insular location. Boats capable of navigating frigid and storm-prone subarctic waters were a prerequisite for settlement of the Aleutians, and given the unforested nature of southwest Alaska and the Aleutians at that time (Brubaker et al. 2001), we can infer that some form of skin boats were in use. These were probably tailored skin and frame boats, perhaps similar to those used in more recent centuries (cf. Misarti and Maschner 2015).

Descendants of the Anangula tradition continued to live in the Eastern Aleutians throughout the Holocene, living on fish, marine mammals, birds, roots, and berries (Dumond 2001; Knecht and Davis 2001). Radiocarbon dates suggest a protracted expansion westward that brought early settlers as far west as the Rat Islands by at least 5,500 cal B.P. (4780 ± 270 RCYBP: Funk 2011) and the Near Islands by 3,000 years ago (3450 ± 90 RCYBP: Corbett et al. 2010; Dumond 2001; Dumond and Bland 1995). The westernmost islands in the chain, the Commanders, may have remained unoccupied until first Russian landing in A.D. 1741 (McCartney 1984).

South of the Alaska Peninsula, the oldest known occupations on the Kodiak Archipelago date to around 7,500–7,000 cal B.P. (Fitzhugh 2003, 2004; Steffian et al. 2002). The earliest assemblages from these Ocean Bay-period sites have strong parallels with the later phase of the Anangula tradition (Dumond 2001; Knecht and Davis 2001), suggesting common derivation. Evidence from the Tanginak Spring site (KOD 481) may indicate colonization of the archipelago shortly before 7,500 cal B.P. (Fitzhugh 2004) and might also support a more direct descent of Kodiak maritime traditions from earlier Anangula antecedents in the Eastern Aleutians. Unifacial blades and microblades of

Early Anangula form appear in the lowest levels of the Tanginak Spring site (Fitzhugh and Trusler 2009). As in the Aleutians, boats and maritime subsistence would have been prerequisites for successful colonization of Kodiak. While fauna are poorly preserved in the earliest sites, by 6,000 years ago shellfish, fish, seal, sea lion, sea otter, and porpoise bones are found in Kodiak middens (Kopperl 2003; Steffian et al. 2002). These animals were hunted with composite bone fish hooks, barbed (nontoggling) harpoons, as well as chipped stone lances.

In variety, if not in proportion, the earliest faunal data from Kodiak suggest that people already exploited the foods that would remain dietary staples into modern times. Even so, certain taxa gained in importance as human populations expanded. Kopperl (2003, 2013) reports a trend between 7,000 and 4,500 cal B.P. of declining sea mammal use (especially sea otter) and an increase in the importance of cod. With the formation of semipermanent settlements, this trend intensified with development of technologies for the mass harvesting and processing of fish around 4,000 years ago (Steffian et al. 2006). On Kodiak and elsewhere around the Northeast Pacific, population growth, the expansion of villages, warfare, and institutional inequality emerge in the last 2,000 years, in conjunction with increasingly intensive technologies and labor coordination for maritime harvests (e.g., fish weirs, poison-dart whaling) and resource patch ownership (Crowell 1994; Fitzhugh 2003; Hoffman 1999; Maschner and Reedy-Maschner 1998; Steffian et al. 2006).

In total, the evidence supports the presence of maritime-adapted coastal communities in British Columbia and southeast Alaska prior to 10,000 years ago, in the Eastern Aleutians by 9,000 years ago, and on the Kodiak Archipelago by 7,500 years ago. Early Holocene coastal communities were generally small and fairly mobile (Fitzhugh 2002). For several thousand years afterwards, these communities multiplied, eventually settling into semipermanent villages. They adopted more intensive approaches to harvest resources, including toggling harpoons, net fishing, and large-scale processing facilities. This allowed people to store in quantity for the winter lean season and may have prompted additional population growth. These practices culminated in the late Holocene during the last 3,500 years with the development of competitive, relatively complex social units in which control over intensive resource harvesting supported the development of status differentiation, endemic warfare, and territorial ownership.

Northwest Pacific

In comparison to the Northeast Pacific, evidence for maritime lifestyles appears relatively late over most of the Asian Subarctic. This is so despite convincing evidence farther south—around the Japanese archipelago—of distant boat travel by 30,000 years ago and clear maritime economies by the earliest Holocene (Takashi 2012; Habu 2010).

Early and gradual development of maritime technology and activity around the Japanese archipelago is contrasted with later and seemingly abrupt development of

maritime activities around the Sea of Okhotsk, western Bering Sea and the Asian Arctic coasts. Late Pleistocene and early Holocene sites are found in interior zones throughout this region, many containing evidence of riverine/aquatic subsistence (Dikov 2003 [1977], 2004 [1977]; Izuho et al. 2012; Kuzmin 1995; Mochanov 2009 [1977]; Okada 1998; Pitulko 1999; Pitulko et al. 2004; Tabarev 2011; Vasil'evskii 1998). The record of early coastal occupation and maritime economies, however, is much later over most of this area, with the earliest in the south and significant delays apparent to the north.

In Hokkaido, Sakhalin, Primorye, and the southernmost Kuril Islands, the earliest convincing data for maritime settlement and subsistence begins between 9,000 and 7,000 years ago. While not necessarily recorded in each of these locations, this evidence includes initial use of toggling harpoons, seal remains, shell middens, and settlement on coastal terraces (Okada 1998; Popov and Yesner 2006; Vasil'evskii 1998; Vasilevsky and Shubina 2006; Vasilevsky et al. 2010; Yamaura 1998; Yanshina and Kuzmin 2010). Fully developed maritime lifestyles are clearly evident around Hokkaido by 4,500 cal B.P. as Japanese and Steller sea lions, fur seals, and dolphins were hunted even on the seasonally ice-packed Sea of Okhotsk coast (Yamaura 1998). At this time, people appear to have ventured out into the more remote Kuril Islands, where full maritime adaptations would have been essential (Fitzhugh 2012).

The Kuril Islands represent a transitional case in the antiquity of maritime occupations around the Sea of Okhotsk. This is seen in the stark contrast between the earliest settlement of the southernmost islands around 8,000 cal B.P., and the earliest archaeology in the more remote islands, where known sites date to 4,000 cal B.P. and later (Fitzhugh 2012). This mid- to late Holocene northward expansion is mirrored in autochthonous developments around the northern and eastern coasts of the Sea of Okhotsk and Bering Sea.

On southern Kamchatka, descendants of terrestrial Paleolithic or Neolithic hunter-fisher-gatherers show only incremental interest in maritime resources starting 4,000–3,500 cal B.P. when coastal sites are first established and marine animals start being represented in iconography (Dikov 2003 [1977]; Kiriya 2007 [2003]). Even so, terrestrial fishing and hunting remained primary into the twentieth century (Jochelson 1905). Evidence of Kamchatka obsidian traded south into the central Kurils shows boat-based contact between southern Kamchatkan peoples and maritime-dependent Kuril Islanders by at least 2,500 cal B.P. (Phillips 2010).

On the northern Sea of Okhotsk, near Magadan, interior populations settled the sea coast and offshore islands only around 3,000 years ago, where they appear to have developed unique maritime traditions (Lebedintsev 1998). Eventually this group expanded around the northeast Sea of Okhotsk to settle northern Kamchatka, establishing the earliest archaeologically visible maritime tradition in that region (Old Koryak: Jochelson 1905).

North up the western coast of the Bering Sea, between Kamchatka and the mouth of the Anadyr River, the first coastal and maritime living also appears around 3,500 cal B.P. (Orekhov 1998). Barbed, bone-tipped arrows appear to have been used for marine mammal hunting. Fish were caught using barbed bone leisters and fish nets. Orekhov

sees this Lakhtin culture as interior hunters and fishers new to the coast. Initially, Lakhtin people hunted, fished, and gathered close to shore, positioning their winter settlements near pinniped rookeries, where animals could be shot and retrieved without harpoons. Summer campsites were placed on rivers and lakes for fishing and bird hunting.

In overview, the earliest evidence of coastal and maritime adaptations around the Subarctic Northwest Pacific signals a significant age difference between southern and milder coasts of the southern Sea of Okhotsk, with early Holocene maritime use, and the more northern regions, including the remote Kuril Islands, where maritime foci emerge—apparently independently—in several locations only after 4,000 cal B.P. If these differences are representative of the true history of maritime development across this region, the delay in settlement of the more northern coasts presents a fascinating puzzle—one that is only amplified through consideration of the Arctic Pacific region and the eastern Bering Sea.

As it did in the Northeast region, maritime culture across the Subarctic Northwest Pacific littoral intensified during the later Holocene, especially after about 2,500 cal B.P. Residents across the region elaborated sea mammal hunting technologies, built up dense maritime middens, intensified harvests to include whales, and settled in increasingly large villages, often with defensive facilities and other evidence of intercommunity warfare and indications of expanding social networks (Amano 1979; Orekhov 1998; Samarin and Shubina 2007; Yamaura 1998).

THE ARCTIC PACIFIC

Of the three regions considered here, densest winter sea ice forms over the continental shelf from the Gulf of Anadyr in Siberia to the Yukon Kuskokwim in southwest Alaska, and north to the Chukchi Sea and Arctic Ocean. The earliest maritime complexes of this region follow a similar trajectory of maritime development to that of the northern Sea of Okhotsk, Kamchatka, and western Bering Sea—areas also witnessing seasonal sea ice—with *significant* maritime developments appearing only after about 3,500 cal B.P., to be followed somewhat later by more intensive maritime developments such as whaling. The 8,000-year-old Zhokhov site on the New Siberian Islands in the Arctic Ocean stands in extraordinary contrast to this generalization. There, Pitulko (1999) recovered abundant remains of caribou and polar bear along with a few seal bones and a walrus ivory point. The New Siberian Islands would have been part of the mainland at the time of occupation, and while polar bear is an ice-obligate sea mammal, the site's lead investigator, Pitulko (1999), dismisses any maritime interpretation for the assemblage.

Leaving aside Zhokhov, the earliest possible claims for marine focused occupation in the Arctic Pacific come from Denbigh Flint Complex sites in northwest Alaska, beginning 5,400 cal B.P. but most prevalently between 4,500 and 3,700 cal B.P. (Ackerman 1998; Anderson and Freeburg 2013). Giddings (1951, 1964) originally suggested a partial

maritime focus on the basis of projectile points found at the Iyatayet site and on the position of several Denbigh sites in coastal locations. While small numbers of seal bones have been recovered at Denbigh sites in northwest Alaska and related Arctic Small Tool tradition (ASTt) assemblages in Arctic Canada, the lack of well-preserved fauna prevents any definitive conclusions about the importance of marine taxa for subsistence. Strong evidence suggests that Denbigh people spent a considerable portion of the year on interior lakes and rivers (Tremayne 2011), coming to the coast—possibly to hunt and fish—as part of their seasonal round. Most Alaskan archaeologists conclude that Denbigh and ASTt were, at best, minimally maritime in comparison with subsequent occupations (Ackerman 1998; Dumond 2000).

Beginning ca. 3,500–3,000 B.P., there is evidence of true seasonal maritime exploitation both in northeast Siberia and in northwest Alaska. Wrangel Island's Devil's Gorge site, approximately 180 km north of the Siberian mainland, produced a fragmented toggling harpoon and faunal remains dominated by walrus and duck (Dikov 2004 [1977]). Pitulko (1999) believes that this was a summer walrus-hunting camp for caribou hunters from the mainland. This is based on the presence of a comparably aged and stylistically analogous toggling harpoon from Ust-Belaia on the Anadyr River. Recent excavations at the Unenen site on Chukotka add new evidence to the early maritime activities in Arctic Siberia. Gusev (2014) reports dates between 3,200 and 2,900 RCYBP (3,500–3,000 cal B.P.) and a slate engraving with a whale hunting scene. He believes it may relate culturally to the Devil's Gorge site and the Alaskan Old Whaling site. If the dates are accurate, this would be the first clear evidence of whaling in the Bering Strait region 3,000 or more years ago.

At Cape Krusenstern on Kotzebue Sound, the anomalous Old Whaling site represents significant investment in maritime hunting sometime between 3,100 and 2,700 cal B.P. (Darwent and Darwent 2005). A comprehensive faunal analysis suggests that the primary subsistence focus there was seal and caribou, while the hunting of whales remains unconfirmed (Darwent 2006). Old Whaling, Devil's Gorge, and now Unenen have been interpreted as representatives of an elusive Old Whaling culture (Ackerman 1998; Gusev 2014), possibly derived from older maritime traditions of southern Alaska (Dumond 2000). Stronger evidence of whale hunting emerges several hundred years later around the Bering Strait.

Sites of the Choris culture, starting about 3,000 cal B.P., provide the first evidence of widespread maritime activities around northwest Alaska. People used a simple toggling harpoon form for the harvesting of seals, and also hunted caribou near the coast. As with Denbigh predecessors, Choris people made seasonal movements between coast and inland areas (Ackerman 1998; Dumond 2000). This pattern persists in one form or another for some residents of coastal northwest Alaska (Norton, Ipiutak) and south around the eastern Bering Sea coast.

The first convincingly full-time maritime adaptations appear on the Chukchi Peninsula, Diomed Islands, and St. Lawrence Island around 2,000 years ago with the Old Bering Sea/Okvik sites. This tradition represents the wholesale expansion of marine mammal hunting in which seal, walrus, and now clearly whale were captured

by hunting crews using distinctively decorated toggling harpoons of various sizes. This development co-occurred with and may have facilitated the formation of permanent, year-round settlements of unprecedented scale, and the emergence of social competition and ethnic differentiation around the Chukchi Sea (Mason 1998). A succession of rapidly changing or coexisting and interacting cultural groups resulted in the fluorescence of the Thule culture roughly 1,000 years ago that subsequently introduced—and then abandoned—Arctic Pacific whale-hunting traditions to the Canadian Arctic around 750 cal B.P. (A.D. 1200: Friesen and Arnold 2008).

The Bering Sea coast south of Seward Peninsula, especially around the Yukon Kuskokwim Delta, is still poorly investigated. Shaw (1998) suggests that mixed maritime and terrestrial adaptations were present as early as 3,500 cal B.P. By 2,400 cal B.P., the population expanded on the coast and up the rivers using new net-fishing practices. Riverine salmon fishing has dominated the subsistence economy on the mainland since that time, with marine mammals playing only a secondary role. This pattern of expanded focus on intensive, net-based fishing around the eastern Bering Sea is preceded by 2,000 years in the Gulf of Alaska (Steffian et al. 2006), and may indicate a population expansion from the Alaska Peninsula region (Crockford 2008; Dumond 2000). On Nunivak Island, analysis of 2,000-year-old human hair suggests an exclusively maritime diet in that location, despite the availability of caribou (Britton et al. 2013).

DISCUSSION

Three notable patterns emerge from this review of evidence. The first is the lack of a Pleistocene maritime record. The second is an asymmetry in the timing of earliest coastal or maritime archaeology, with the Northeast (British Columbia to the Aleutians) exhibiting strong maritime patterns by the earliest Holocene, while the Northwest and Arctic Pacific reveal definitive maritime activities only in the late Holocene (Figure 10.2). The third is that the earliest maritime developments often appear to be tentative and seasonal extensions of local precedents in terrestrial environments. Exceptions include the central Kuril and Aleutian islands, lacking a true “terrestrial” source area, and perhaps the Denbigh and Choris cultures in the Bering Strait region, which may have been transplanted from the northern Siberian coast (e.g., Powers and Jordan 1990). Even in the Northeast Pacific region, the much earlier maritime evidence hints at autochthonous maritime adaptations—a point developed below. These patterns raise several important questions in the effort to better understand trajectories of maritime lifestyles in the Beringian region relating to the representativeness of available evidence; the possibility of descendent maritime populations from a presumed Pleistocene coastal migration to the Americas; the 5,000-year offset in maritime activities between the Northeast and other regions; and the ultimately parallel development of intensified marine exploitation, whale hunting, warfare, and growing scales of social interaction in the late Holocene.

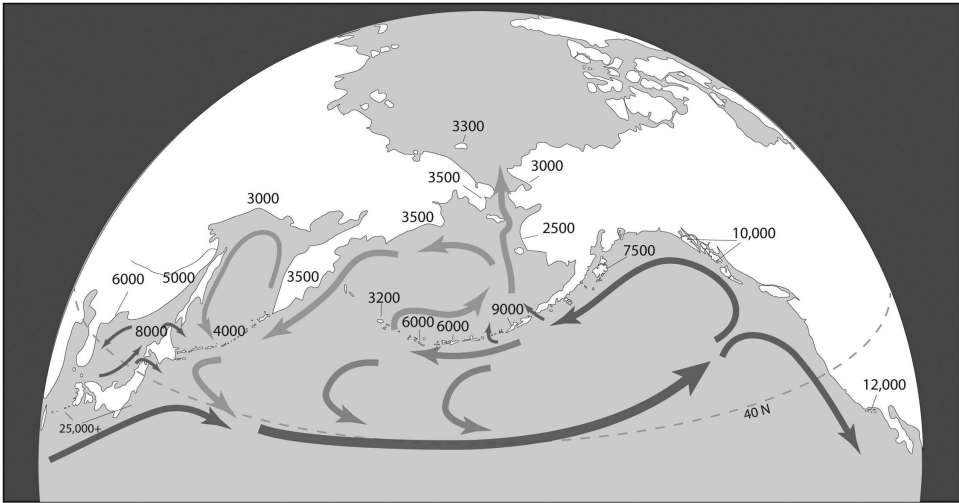


FIGURE 10.2 Map of the North Pacific plotting the dates of earliest definitively “maritime” coastal archaeology overlaid with contemporary ocean currents and relative differences in sea surface temperatures (darker arrows represent relatively warmer currents). Illustration by the author from a Google Earth projection.

SAMPLING AND PRESERVATION BIAS

Factors that could create systematic differences in sampling bias between different regions of the Subarctic North Pacific could include discrepancies in (1) intensity of archaeological investigation, (2) national research traditions (e.g., more and less fashionable research questions), and (3) cultural resource-preservation laws. A systematic, quantitative analysis of these variables is beyond the scope of this chapter and would be a worthwhile future endeavor. A preliminary examination is offered here.

The number of archaeological research projects and personnel over the past 60 years has certainly been higher in Alaska than in the Russian Far East and Siberia. This asymmetry is related to greater population growth and resource development in Alaska, combined with federal and state legislation to promote cultural resource management and conveyance of traditional territory under the Alaska Native Land Claims Settlement Act of 1971. These provisions fail to differentiate southern Alaska, with its 10,000-year human antiquity, from northwestern Alaska. Prior to the collapse of the Soviet Union, archaeological research was directed by major research labs in the Far East and Siberian branches of the Soviet Academy of Sciences, as well as modestly resourced museums and universities. While this research was often reported and synthesized by a small number of laboratory chiefs and academicians, several research teams often worked the field out of each lab, conducting projects at a similar pace to those conducted around the Alaska coast. Funding crises and a loss of enthusiasm for archaeological careers among young Russian citizens have significantly reduced the intensity of research since 1990.

On balance, I believe that research bias is unlikely to account for the large-scale patterns documented in this chapter, which do not map to national boundaries. This claim is supported by the coherence of these patterns across the gradients of higher- and lower-intensity research.

The most likely source of systematic preservation bias for the coastal archaeology explored here is postglacial sea-level rise. Global (eustatic) sea-level rise occurred at a rate of approximately 10 meters per 1,000 years from 15,000 to 7,000 cal B.P. (Fleming et al. 1998). Around 7,000 cal B.P., eustatic sea level was 3–5 meters below present and the rate of sea-level rise slowed dramatically (Fleming et al. 1998). It is therefore not surprising that, in general, the record of coastal archaeological sites picks up frequency at this time.

Preservation of earlier coastal sites above modern sea levels depends on local factors that compensate for some amount of eustatic sea-level rise. Relative sea level (RSL) at any location is a product of eustatic sea-level position and local factors affecting land-level changes (Pedoja et al. 2011). RSL history is especially complicated in areas of significant glacial and tectonic activity. Areas of heavy ice-loading experienced significant isostatic rebound following deglaciation, sometimes generating crustal uplift rates comparable to or exceeding eustatic rates.

Site loss due to submergence is especially probable in areas where the coast slopes gradually, and thus small changes in sea level move the coastline large horizontal distances (Erlandson 2001). The eastern Bering and Chukchi coasts especially exhibit this characteristic, with near-modern coasts established only around 5,000 years ago (Jordan and Mason 1999). Elsewhere, steeper shorelines and greater variability in tectonic and isostatic histories have preserved shorelines 10,000 and occasionally even 14,000 years old in some areas (e.g., Fedje and Christensen 1999; Jordan 2001; Mann and Streveler 2008).

Because the earliest sites in the Northeast Pacific date within this interval, sometimes on the earliest landforms preserved above sea level, it is reasonable to infer that the oldest-known archaeological record is truncated by sea-level rise in this area (Baichtal and Carlson 2010; Erlandson 2001; Fedje et al. 2005). In contrast, the Northwest Pacific coasts from Japan through Kamchatka are similarly steep and tectonically active. With earliest maritime archaeology dated to the 9,000–7,000 interval at the southern margins of the Sea of Okhotsk, we may expect antecedents to have been lost to sea-level rise, as we infer for the Northeast Pacific. If sea level and tectonic dynamism were the main determinants of archaeological antiquity then the record from the steep and tectonically active Kuril and Kamchatka coasts should have similar early Holocene inception. Instead, the oldest maritime dates are much younger, in line with those around the coasts to the north.

In sum, rising sea levels present a tricky problem for our efforts to identify the earliest maritime settlements around the Subarctic and Arctic Pacific. The oldest evidence is found in the Northeast, a region of steep shorelines, tectonic activity, and postglacial isostatic uplift. In the Northwest region, the steep and tectonically active *southern* shores likewise reveal maritime evidence that dates approximately to the interval we would predict from sea-level history in the absence of isostasy (i.e., 9,000–7,000 cal

B.P.). The later maritime appearance on the shallow northern Sea of Okhotsk, northern and eastern Bering Sea, and the Chukchi Sea might likewise be explained by the absence of tectonic or isostatic uplift in these areas and the greater horizontal displacement of the coastline that continued until ca. 5,000 cal B.P. Two factors mitigate such a broad conclusion. The first is that the Kurils, eastern Kamchatka, and western Bering Sea coast (south of the Gulf of Anadyr) share the advantageous characteristics of steep shorelines and high tectonic activity, and yet their earliest maritime evidence matches that for the shallower coasts. Second, discussed more fully below, the archaeological data throughout these later dated regions appear to include processes of accommodation by terrestrial communities to novel maritime strategies. These points suggest that the later maritime start dates from the Kurils northward and throughout the Arctic Pacific region represent intact sequences of maritime adaptation, while the earliest dates of maritime lifeways in the Northeast and southern Northwest provide limiting ages only. We can conclude that a gap of *at least* 4,000 years separates maritime activities in the Northeast and the southern Northwest from that to the west and north of these regions, respectively. If earlier maritime settlers or migrants used the more northern regions in the late Pleistocene, they disappeared from them before the current known archaeological record was established.

INFERENCEAL HISTORY OF MARITIME SETTLEMENT IN THE NORTH PACIFIC

Archaeological evidence from North and South America now makes it plain that humans migrated to the Americas before 14,000 cal B.P. (Dillehay 2009). Lacking evidence for terrestrial migration or a plausible land route past continental ice, many archaeologists now consider one or more coastal—maritime-oriented—migrations likely. Sea-level rise provides a logical explanation for the absence of evidence for such migration(s). That does not prevent us from attempting to model how such a migration might have occurred.

Successful colonization depends on access to a sufficiently large breeding population to prevent stochastic extinctions (Rogers 1992; Wobst 1974). Therefore, successful migration by small communities of late Pleistocene hunter-gatherers should occur through population expansion. This process would leave successive settlements around the North Pacific Rim on now-submerged coastlines. A prerequisite of such an expansion would be the ability to survive the environmental conditions of the Late Glacial North Pacific. One might conclude then that such adaptations would precondition people to long-term demographic success around the Subarctic North Pacific Rim. Had their descendants remained along these coasts into the early Holocene, the earliest archaeological assemblages should represent descendants of a pan-North Pacific maritime tradition with general affinities in “coastal” material culture.

Based on comparison of late Pleistocene assemblages from Japan, Kamchatka, and the western coasts of North and South America, Erlandson and Braje (2011) propose the existence of a circum-Pacific, late Pleistocene bifacial and stemmed-point tradition distinct from later Beringian industries—though none of these industries is clearly tied to a maritime assemblage. If they are correct, we might expect this stemmed-point tradition to have been used on the now-submerged shoreline of the northern Pacific Rim sometime before 14,000 B.P.

Following Tamm et al. (2007), Hoffecker et al. (2014) argue that Beringia served as a Late Glacial refugium for people (ostensibly ancestral Paleoindian or Amerindian, but see Derbeneva et al. 2002; Volodko et al. 2008) who developed unique genetic characteristics before rapid expansion into the postglacial Americas ca. 15,000 cal B.P. and prior to the arrival of genetically and technologically distinct Paleoarctic (Dyuktai or Denali) microblade users expanding out of central and eastern Siberia. Considering the numbers needed to sustain a refugium population, the absence of significant archaeological evidence for this proto-Paleoindian population in Beringia makes sense only if this population was largely confined to regions later submerged by rising sea levels. Given the apparent breadth of terrestrial shrub-tundra ecology across both now-flooded and un-flooded parts of the Beringian interior, the coastal/littoral/maritime zone would appear to have been the habitat that would have best supported a refugium population in isolation prior to 10,000 years ago.

The earliest known coastal sites around the Subarctic Northeast Pacific include the use of microblades, assorted microblade cores, including wedge-shaped varieties, burins, and sometimes, bifacial points. While the lithic technologies are more eclectic than older assemblages in the Beringian interior, the similarities connect these early coastal sites to the interior Paleoarctic tradition (Dumond and Bland 1995; Fitzhugh 2004; Fedje et al. 2011; Steffian et al. 2002). The evidence suggests autochthonous development of coastal adaptations along the shores of Alaska by 8,000–10,000 cal B.P. by Paleo-Arctic settlers from the Alaskan interior. The Paleoarctic tradition is notably distinct from the earliest archeological assemblages found in the rest of North and South America, including those found from southern British Columbia to California at the time (Erlandson and Braje 2011; Fedje et al. 2005). If these more southerly coastal inhabitants derive from source populations who came by boat around the North Pacific Rim, the presence of maritime Paleoarctic settlers by 8,000–10,000 years ago indicates that earlier settling populations previously either disappeared or were assimilated. At present these are equally possible scenarios.

If the earliest settlers of the Americas came from the Subarctic coasts of Beringia, moved rapidly into the southern Americas ca. 15,000 years ago, abandoning the region for later (much later in some regions) settlement by newly maritime Paleoarctic culture, an obvious question is, “why?” One possibility is that increased orbital seasonality from the last glacial maximum (LGM) to the early Holocene made winters harsher, despite warming summers. Changes in orbital precession (variation in the tilt of the Earth’s rotational axis) and eccentricity could provide an underlying mechanism for this evacuation and at the same time provide a mechanism for the return of

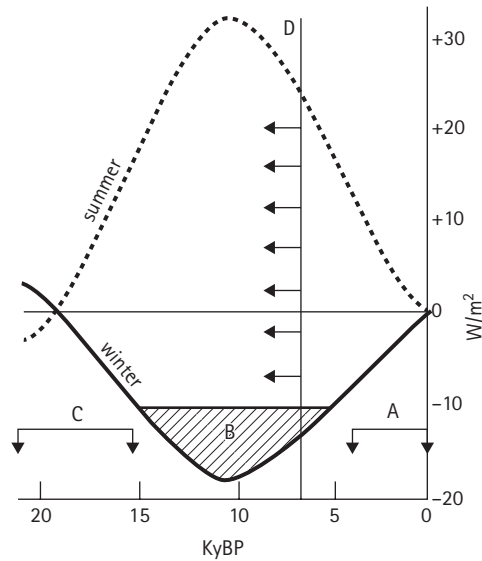


FIGURE 10.3 Summer (June–August: dashed) and winter (December to February: solid) curves reflecting orbital (precessional) variation in insolation anomalies of the Northern Hemisphere from the last glacial maximum (20 kya) to the twentieth century (after Kutzbach and Guetter 1986). Archaeological evidence for coastal- or maritime-based occupation of the northern Okhotsk, Bering, and Chukchi seas is limited to the last 3,500 years (A) when winter temperatures were becoming milder and seasonal differences between summer and winter extremes were lessening. Colder winters and more extreme seasonal differences may have inhibited coastal adaptations from 15,000 to 5,000 years ago (B). Despite cooler summers that sustained glaciation 20,000 years ago, warmer winters and low seasonality might have made the marine system attractive to coastal dwellers at the time (C). If marine-adapted people lived around the Subarctic coasts in the late Pleistocene, they could have been forced to evacuate around 16,000–15,000 years ago as winters became cooler. This model would provide a mechanism for the first movement of people into North and South America. It would also account for the apparent novelty of maritime adaptations among late Holocene Subarctic settlements. Archaeological evidence of earlier coastal settlement can be expected to be adversely affected by rising sea levels prior to 7,000–10,000 B.P. (D). See text for discussion of maritime adaptations in the last 3,500 years. Illustration composed by the author.

hunter-gatherers to the Subarctic seas only in the late Holocene (Figure 10.3). Varying on a cycle of approximately 23,000 years, seasonal differences between winter and summer were minimal just before and during the LGM as they are today. By contrast, high-seasonal extremes were in force at the start of the Holocene. While additional proxy evidence is needed to quantify changes in winter conditions from the LGM to early Holocene, the evacuation of the maritime Subarctic may have been driven by the difficulty of staying put on the shores of the Subarctic seas as winters worsened from 15,000 to 10,000 cal B.P.

ASYMMETRY IN HOLOCENE MARITIME FOUNDATIONS

The asymmetric timing of the earliest documented maritime activities in the Northeast and southern Northwest Pacific compared to regions to the north and west suggests a significant environmental difference between these regions that could explain their unique histories. According to Dumond and Bland (1995) older occupations are found in areas of year-round, ice-free waters, while the late-comers are found around the seasonally frozen, Subarctic seas (Figure 10.2).

The Northeast Pacific has a predominantly temperate, maritime climate due to the influence of the warm currents and the prominently westerly source of weather over the ocean. This may have been important for the early coastal occupation of the region, mitigating the effects of early Holocene high seasonality. Around the Northeast Pacific, the warm maritime climate spawns frequent storms—especially in the Aleutians and Gulf of Alaska—and prevents significant formation of sea ice, except in shallow and protected estuaries and bays.

By contrast, the Northwest Pacific, including the Sea of Okhotsk and coasts of the Kamchatka Peninsula, is influenced by cold currents out of the western Bering Sea (Qiu 2001). Weather patterns differ seasonally. Cold continental air sweeps the region from Siberia in winter, fueling sea-ice formation and pack ice that often extends to Hokkaido and the southern Kurils. In summer, warmer circulation comes up the East Asian coast. The Arctic Pacific region is the coldest of the three zones. Here, cooled Pacific waters over the shallow Bering Shelf, mixed with fresh continental runoff and chilled by continental weather, support sea ice for much of the year.

These broad oceanographic differences may matter in the history of maritime developments across the regions. The delay in the Bering-Chukchi and northern Okhotsk could relate to the difficulty of adapting maritime technology to frozen coasts and sea ice. Boating, sledging, and hunting on and around sea ice require unique technologies and skills, many of which are not seen in the archaeological record anywhere prior to the late Holocene. On the other hand, some of the same technologies must have already been practiced around the hypothermia-inducing and storm-prone waters of the Eastern Aleutians and Gulf of Alaska from the early Holocene.

Holocene environmental changes may provide a more convincing explanation for these spatial discrepancies. Oceanographic proxies from the Bering, Chukchi, and Okhotsk seas suggest an overall trend of decreasing sea ice and increasing primary productivity from the early to late Holocene (Gorbarenko et al. 2004, 2010; Katsuki et al. 2009; McKay et al. 2008; Sakamoto et al. 2005). These data suggest that the coasts of the seasonally ice-bound seas may have been simply unattractive to maritime hunter-gatherers before the mid-Holocene, not only because of ice or high seasonality *per se*, but because of low ecological productivity. When taken together, early Holocene seasonality, colder winters, and low biological productivity may have made the Okhotsk,

Bering, and Chukchi seas relatively undesirable habitats for human hunter-gatherers. In contrast, the ice-free and oceanographically moderated environment of the greater Gulf of Alaska may have made the Subarctic Northeast Pacific the most attractive region for (re)colonization and the development of maritime lifestyles in the terminal Pleistocene or early Holocene. It was then only as the conditions improved in the marginal sea zones during the mid- to late Holocene that maritime adaptations developed. In some cases, these developments may have resulted from the expansion of more temperate maritime communities into previously underutilized Subarctic and Arctic regions. In other cases, terrestrial foragers living in adjacent territories appear to have shifted the focus of their activities increasingly to littoral and maritime lifestyles, no doubt with some degree of knowledge of the maritime practices of southern neighbors through long-established social and communication networks. While still of uncertain maritime dependence, Arctic Small Tool tradition expansion east into Arctic Canada more than 4,000 years ago, may be a product of the shift in adaptations that brought more fully maritime lifeways to the Okhotsk, Bering and Chukchi Seas around this time.

LATE HOLOCENE MARITIME INTENSIFICATION

In contrast to earlier differences, maritime intensification in the last 2,000 years is remarkably consistent across the North Pacific. Maritime cultures from Japan to the Chukchi Sea to the British Columbian coast developed high population densities, established large villages, engaged in economic and military competition with neighboring communities, and formed regional political entities (Anderson 2011; Fitzhugh 2003). These developments were made possible by intensification of marine or mixed marine and terrestrial economies, including the development of improved technologies for harvesting prey, such as salmon, walrus, and whales. Whale hunting in particular represents an intensive and cooperative strategy that emerged significantly in the past 2,500 years in almost all regions. Technological advances in boating may have facilitated this hunting as well as migration, warfare, and long-distance trade. Innovations in dog sledging in combination with boats may have facilitated movement over broken sea ice and expanded access to offshore resources in the Arctic regions.

All of these changes encouraged new labor practices (e.g., communal whale hunting in the north and west and seasonally intensive fishing and processing south of the Bering Strait), social reorganization (the emergence of whaling captains and crews in the north, whale hunter secret societies in the Aleutians and Kodiak, and emergent status competition throughout), and intergroup warfare, perhaps associated with more marked ethnic differentiations (Fitzhugh 2003; Mason 1998; Samarin and Shubina 2007). As a result of these processes, coastal communities from the Sea of Okhotsk to Southeast Alaska found themselves living more similar lifestyles than could be said of any previous time

in the Holocene. These similarities have been noted since Boas's late nineteenth-century Jessup North Expedition (Fitzhugh and Crowell 1988).

CONCLUSION

This chapter explored the antiquity and subsequent development of maritime adaptations around the North Pacific. While a reasonable case can be made that the Americas were peopled by maritime-adapted people in the late Pleistocene, the Beringian archaeological records remain essentially void of positive evidence. Instead they reveal a later expansion to the marine zone by terrestrial foragers. These maritime adaptations emerged by 9,000 cal B.P. or earlier in the climatically moderate and highly productive Northeast Pacific, and only after 5,000 cal B.P. (significantly, only after 3,500 cal B.P.) in the seasonally frozen Okhotsk, Bering, and Chukchi seas. This chapter explored possible sampling, preservation, climatic and biogeographical reasons for this asymmetry. It is proposed that living around these frozen seas in the harsher winters of the early Holocene could have been a limiting factor. Of course, cold winters are not necessarily confining, and by themselves may have been little disincentive to Subarctic maritime settlement. The apparently low biological productivity of the marginal seas in the early Holocene, coupled with harsher winters, may have made maritime life unattractive before the late Holocene. Future work can be expected to refine this picture.

Beringia has been a focus of speculation and study for decades concerning the settlement of the Americas and the development of maritime adaptations to frozen coastal regions. While we still have much to learn, current evidence supports several tentative conclusions. First, if the Subarctic North Pacific provided the route for Pleistocene settlement of the Americas, these migrants left little influence on the archaeological record of Beringia and either died or left the area before the start of the Holocene. Second, maritime adaptations in the Holocene appear as largely autochthonous developments of interior communities shifting to coastal lifeways. This is indicated for both the early settlements of the Northeast and the much later settlement of the Northwest and Arctic Pacific regions. Taken together, the first two conclusions lead to a third: maritime adaptations may have developed in the North Pacific Rim on different occasions and by different communities of people from the late Pleistocene to recent millennia. This implies a much more complex and interesting history than some previous narratives have suggested. Fourth, major climatic and ecological changes occurred at time scales appropriate to have influenced the history of human settlement, abandonment, and resettlement of the North Pacific. We do not yet know how those changes would have directly affected the lives of maritime communities. Fifth and finally, intensification of maritime lifeways occurred in the late Holocene around the North Pacific. The parallels and general synchrony are remarkable and may reflect a shared "ecosystem service," such as unprecedented late Holocene North Pacific marine productivity and/or expanding sociopolitical networks that wove North Pacific maritime communities into

an increasingly interconnected social system. Most studies of these changes have been focused on relatively local sequences. The larger parallels deserve more attention.

Overall, the archaeology of maritime adaptations provides a unifying focus for the study of the North Pacific that bridges continents, countries, and cultures. While work remains to be done at the local and regional level—to find and explore archaeological sites and to flesh out our understanding of coastal human and environmental histories—more coordinated effort is also needed at the scale of the Subarctic and Arctic North Pacific to compare and synthesize more local data and to explore the changing ecological contexts of maritime lifeways.

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CHAPTER 11

FIRST MARITIME CULTURES OF THE ALEUTIANS

RICHARD DAVIS, RICHARD KNECHT,
AND JASON ROGERS

INTRODUCTION

HEREIN we examine the initial period of Aleutian prehistory, a period which approximately spans 9,000–3,000 years ago. During this time early maritime settlers expanded westward over some 1,500 km from the Alaska Peninsula out to at least as far as the Rat Islands in the central Aleutians. The earliest sites generally are short-term occupations lacking preserved midden deposits or extensive structural remains. By 3,000 years ago, however, substantial settlements, some with multiroom houses, deep middens, and rich artifact inventories are found at several locations. Overall, as we will discuss below, there is considerable evidence for continuity of occupation during the first 6,000 years, but as we will also make clear, there is strong evidence for culture contact and perhaps population movement into and out of the region as well.

Why is Aleutian archaeology important? At the moment, there is little evidence found in the Aleutians of the earliest migrations to the New World (by land or by sea) or of early human skeletal remains which might give direct testimony to the first Americans. Might not the whole archipelago be regarded as a foggy, windswept, and isolated appendix to Alaska and thus largely unconnected to prehistoric developments elsewhere? Many discoveries suggest this is not the case. Here are three striking examples:

- Approximately 5400 years cal B.P. distinctive, bilaterally barbed harpoon forms with line guards were used at the Margaret Bay site on Amaknak Island as well as at the Sanaġan site on Akun Island. They are nearly identical to harpoons recovered from the Ocean Bay site of Rice Ridge on distant Kodiak Island dating to the same period (Knecht et al. 2001).

- Studies of ancient mitochondrial DNA (mtDNA) have shown clear similarities between Aleutian and Greenlandic populations, suggesting common ancestry (Gilbert et al. 2008; Hayes et al. 2005; Raghavan et al. 2014).
- Lithic artifacts closely resembling the widespread Arctic Small Tool tradition (ASTt) first found at the Chaluka site on Umnak have also been found on Amaknak Island at the Margaret Bay site (Davis and Knecht 2005; Denniston 1966).

There are more examples of contact from later prehistoric periods as well (Corbett et al. 1997). Thus, the Aleutians should well be seen as an integral part of the northern world and not as a remote isolate.

The archaeology of the Aleutians has been subject to several reviews in recent years (Corbett et al. 2010; Crawford, Rubicz, and Zlojutro 2010; Dumond 2001a; McCartney 1984) and the interested reader should consult them all. These publications include site descriptions, illustrations of artifacts, and chronological tables, and additionally provide general overviews. Veltre and Smith (2010) have recently compiled a comprehensive account of the history of archaeological investigations in the Aleutians.

The Aleutian chain extends some 1,900 km westward in an arc from the Alaska Peninsula to Kamchatka, occupying a band of latitude between 51 to 55 degrees north. The largest islands in the chain, Unimak, Unalaska, and Umnak, are found in the eastern Aleutians, and they appear to be the locus of the earliest human settlement. The chain divides the North Pacific Ocean from the Bering Sea. Prevailing air mass and ocean current patterns produce nearly constant winds but temperatures are relatively moderate for this northern latitude and they vary only slightly throughout the year. The Alaska Volcano Observatory lists 52 volcanoes for the Aleutians, and there have been frequent volcanic eruptions throughout the Holocene (AVO 2011). Virtually all of the deeply stratified archaeological sites in the eastern Aleutians have multiple tephra layers. Veniaminov (1984 [1840]) wrote the first comprehensive treatment of the Aleutian environment and culture, and it is still worth consulting today. More recent treatments of the Aleutian environment and recent geological history include Black (1974), Laughlin (1980), Jordan (2001), and Crockford and Frederick (2007).

Aleutian waters support a rich resource of pelagic fish and birds. Also sea mammals, notably the harbor seal, ringed seal, northern fur seal, large and small whales, porpoise, sea otter, and sea lion are well represented in many archaeological sites (Crockford et al. 2004; Davis 2001). In addition, once sea levels had reached their modern level, strand flats were cut, which provided habitat for a large variety of invertebrates including chitons, clams, sea urchins, mussels, and scallops. Although no systematic, quantitative work has been done on the dietary contribution of invertebrates in the eastern Aleutians, their ubiquitous presence in sites after about 4,000 years ago testifies to their importance in the diet.

There are a number of issues which remain unresolved in early Aleutian prehistory. Here we introduce four of them and they will be taken up in more detail later in this chapter.

- What are the origin and mode of life of the first known inhabitants of the Aleutians, whose 9,000-year-old occupations are known on the small islets of Anangula and

Hog Island? Were they descendants of an earlier Paleoarctic tradition well known in the interior of Alaska? Did they travel down landfast ice in the winter all the way to Umnak, as Herbert Maschner proposed some years ago (quoted in Mason 2001:117)? Or were they related to some original maritime populations who moved eastward from Asia along the southern margins of the Bering Platform during the late Pleistocene?

- A longstanding issue is the degree of continuity in occupation and cultural tradition. Many of the excavators of the Anangula Blade Site, the Anangula Village site, Sandy Beach Bay, and Chaluka—all on Umnak Island—argued strongly for prolonged cultural continuity (Aigner 1978; Laughlin 1980). Allen McCartney (1984), on the other hand, supported the dual-tradition approach. This consisted of the initial Anangula phase, followed by an occupational hiatus, and then the Aleutian phase, beginning about 4,000 years ago. More recently, we have given substantial support for long-term continuity based on a number of recently excavated sites and an increasingly filled-out ^{14}C -based chronology (Davis and Knecht 2010; Rogers et al. 2009). In addition to the radiocarbon dating, we developed the case for continuity based on artifact technologies, tool forms, and house features.
- The magnitude of Neoglacial climate change (ca. 4,700–2,500 years ago) and its effect on subsistence ecology is a third area which warrants more research. Based on the recovery of ice-obligate species at the Margaret Bay and Amaknak Bridge sites, there is a good case to be made that the Neoglacial led to increased landfast sea ice, which reflects a colder Neoglacial climate. Were there also changes in architecture, settlement, and social organization which might be related to the economic adjustments to environmental changes? The Amaknak Bridge excavation suggests there might be substantial connections.
- Studies of ancient and modern mtDNA have suggested several possible reconstructions of Aleutian population history (Raff et al. 2010; Zlojutro et al. 2006). How congruent is the genetic evidence with what we know archaeologically?

PHASING AND CHRONOLOGY

Despite a history of research that extends back to the 1870s, the prehistoric cultural sequence of the Aleutian Islands remained poorly defined until recently. The early research history of the islands was characterized by numerous large-scale, but often unsystematic, excavations, coupled with uneven reporting of the results (e.g., Hrdlička 1945). The excavation program on Umnak, begun more than 50 years ago by William F. Laughlin, gave evidence for a fairly continuous sequence but with significant gaps, from the Anangula Blade Site to Sandy Beach Bay and Chaluka. Our work on Unalaska and Amaknak in general correlates well with the Umnak site series (Table 11.1), but

Table 11.1 Archaeological Phases for the Eastern Aleutians

Phase	Approximate Chronology (cal b.p.)	Type Sites in Unalaska Bay	Umnak Sites	Diagnostic Artifacts and Features
Late Aleutian	1000–200	Tanaxtaxak (UNL-55), Eider Point (UNL-19), Reese Bay (UNL-63), Morris Cove (UNL-9), Bishop's House (UNL-59)	Chaluka, Upper Level	Abundant ground slate, ulus, and limited chipped-stone inventory; multiple-room houses and longhouses and fortified refuge rocks
Amaknak	3000–1000	Summer Bay (UNL-92), Cahn site D (UNL-18), Amaknax (UNL-54)	Chaluka, middle levels	Appearance of stemmed, notched lithics, elaborate barbing on bone hunting implements, toggling harpoons, asymmetric knives, spall scrapers, and umqan; rectangular houses
Margaret Bay	4000–3000	Amaknak Bridge (UNL-50); Margaret Bay (UNL-48), levels 2 and 3; Tanaxtaxak, basal level; Agnes Beach (UNL-46), upper level	Chaluka, basal level	Blades, ASTt-like tools, stone bowls, plummets, and angle and polished burins; first appearance of labrets, unilateral barbs on harpoons, bone socket pieces, net sinkers, and exotic lithics; stone-walled houses
Late Anangula	7000–4000	Margaret Bay, levels 4 and 5; Agnes Beach, lower level; airport site (UNL-105); powerhouse site (UNL-114); Cahn site K (UNL-47); Quarry site (UNL-469)	Sandy Beach Bay Idaliuk Bay Anangula Village Sanağan (Akun Is.)	Abundant blades, stemmed points, and bilateral barbed harpoons with line guards; first bifacial tools; shallow semisubterranean houses
Early Anangula	9000–7000	Russian Spruce site (UNL-115), Uknodok (UNL-318)	Anangula Blade site	Abundant blades, unifacial tools, transverse burins, large end scrapers, grooved cobble sinkers, ocher grinders, stone bowls, and oil lamps; tent-like houses on shallow depressions

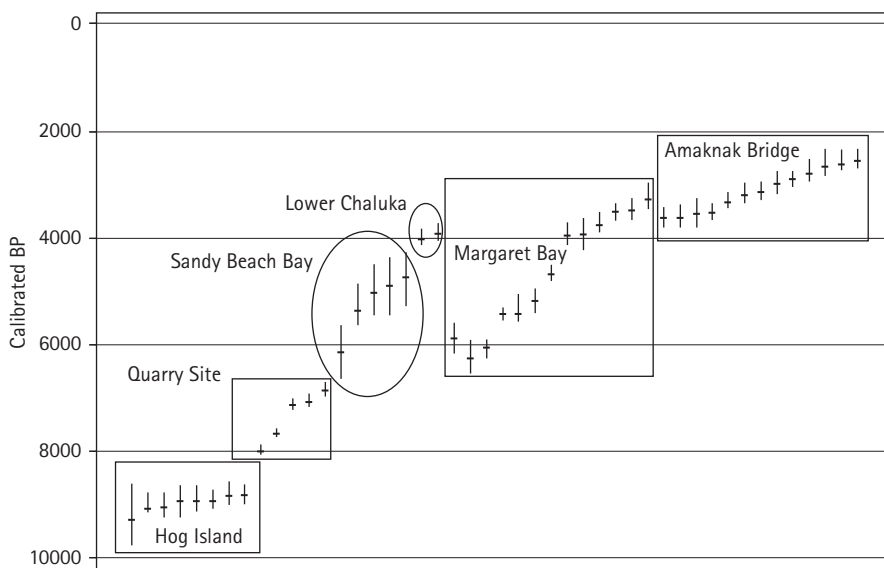


FIGURE 11.1 Calibrated radiocarbon chronology for Unalaska and Umnak.

Drawing by Richard Davis

importantly we have excavated well-stratified and dated sites which provide additional evidence for artifact continuity through time without large gaps (Davis and Knecht 2010). The radiocarbon chronology for the Anangula to Amaknak phases is summarized in Figure 11.1.

Previously we defined phases summarized in Table 11.1 for the eastern Aleutian archaeological sequence based on our Unalaska excavations (Knecht and Davis 2001). In the traditional American archaeological-cultural-historical approach, sequences are composed of a number of phases that have been defined through the formal variation of artifacts and features from a number of sites or archaeological components. Further, the phases are generally chronologically controlled through a variety of relative and absolute dating techniques. The degree of artifact similarity in technology, style, and function between phases has a variety of causes, including internal culture change and cultural discontinuities brought about by the arrival of peoples from outside the region or through adaptations to environmental variations. Archaeological sequences, despite the just mentioned constraints, are the basis of regional archaeological inquiry. Their construction has heuristic value for the testing of ideas concerning the process of culture change and many other concerns of contemporary archaeology. The phases enumerated in Table 11.1 reflect the general archaeological picture for the eastern Aleutians. The phasing has withstood some scrutiny by our colleagues (Dumond 2001b; Hatfield 2010) and has been adopted by others, but it certainly will be subject to future refinement.

The prehistoric sequence begins with the *Early Anangula phase*, first encountered at the Anangula Blade site, where deposits dated to at least 9000 calendar

years B.P. (Laughlin 1975). Two additional Anangula-phase sites of equally ancient age were later investigated on Hog Island in Unalaska Bay (Dumond and Knecht 2001). Although initial investigators at the Anangula Blade site have maintained considerable time depth for the site (Laughlin 1975), several commentators including ourselves have determined that a much more limited period of occupancy, no more than a few hundred years at most, is the most compelling interpretation of the evidence (Davis and Knecht 2010; Dumond and Bland 1995; Mason 2001). No bone artifacts or remains are preserved in these earliest sites; however, lithics are abundant and dominated by core, blade, and burin technology. Large prismatic blades and microblades are common in the Early Anangula sites, along with transverse burins, retouched blades, and endscrapers. Unifacial retouch is exclusively used in shaped tool production, with both projectile points and bifaces curiously absent from these assemblages (Fig. 11.2). Small depressions with red ocher- and charcoal-stained floors with associated post holes suggest the construction of temporary shelters.

The Late Anangula phase, from about 7000 cal B.P. to 4000 cal B.P., adds bifacial technology to the Anangula toolkit, with all the basic elements of the earlier tradition persisting. The recently excavated and reported Quarry site on Amaknak Island described below has evidence of the first bifacial technology in the eastern Aleutians, and it dates to the earliest time of the Late Anangula phase (Rogers et al. 2009). The pattern of adding new tools to an already existing foundation seems to be a theme throughout the Aleutian sequence. The earliest bone artifact so far recovered in Aleutian sites is a burned and calcined bilaterally barbed harpoon from Level 5 at Margaret Bay, ca. 6000 cal B.P. (Knecht et al. 2001:67). Harpoons with prominent cruciform line guards, and eyed bone needles were recovered from the Late Anangula phase levels at Margaret Bay, Level 4, and more recently from the Sanaġan site, Akun Island, ca. 5000 cal B.P.

The *Margaret Bay phase*, (ca. 4000–3000 cal B.P.) has been defined in Unalaska Bay from a series of sites found on marine terraces representing a fossil shoreline perched about two meters above current mean sea level. Core-and-blade technology remained in use, but was greatly diminished until it became relatively rare late in the phase. Traces of contact with the Alaska Peninsula and Kodiak area appear in the form of occasional finds of ground-slate points and ground jet beads and labrets. The Margaret Bay phase is also distinguished by finely chipped and pressure-flaked stone tools including beaked endscrapers, polished adzes, and other characteristics often associated with the ASTt (Knecht et al. 2001). The connections between Aleutian prehistory and ASTt, a tradition that stretches north to the Arctic coasts as far as Greenland, are intriguing, but not yet fully understood (Davis and Knecht 2005). Semisubterranean dwellings were larger and more substantial than the preceding phases, measuring about 7 m in diameter, embedded into the earth as deep as 75 cm, and the house pits were lined with a stone wall. Stone-lined ditches led out from hearth pits and may have increased efficiency of heating and ventilation.

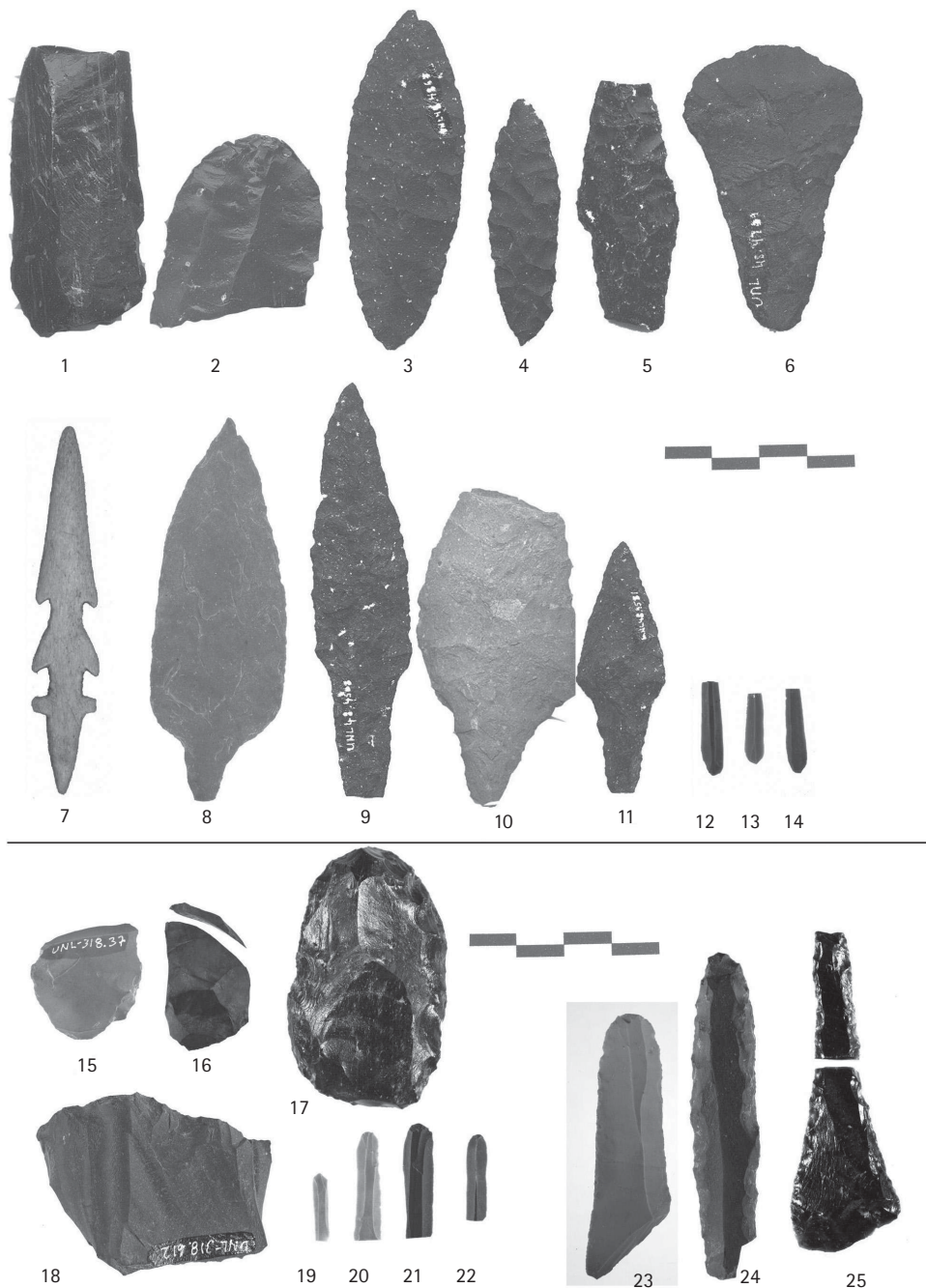


FIGURE 11.2 Artifacts from Early and Late Anangula phases
 (1–14) Late Aleutian phase from Level 4, Margaret Bay site (UNL-48); (15–25) Early Aleutian phase from Uknadok site, Hog Island (UNL-318). (1–2) Blades; (3–4) bipointed bifaces; (5) truncated biface; (6) fan-shaped bifacial knife; (7) bilaterally barbed harpoon with cruciform line guard; (8) short stemmed leaf shaped point, bifacial points; (12–14) microblades; (15–16) transverse burins; (17) endscraper; (18) single-platform microblade core; (19–22) unretouched microblades; (23) retouched blade; (24–25) steeply retouched blades.

Photographs: (1–14) Richard Knecht; (15–25) Nancy Muntz

The Amaknak Bridge site was occupied at a time of transition between the Margaret Bay and succeeding Amaknak Phase, which occurred around 3,000 years ago. The Margaret Bay phase is the primary archaeological culture represented at the site; however, some stylistic and decorative attributes of the Amaknak phase are also present in the collection. The chronology of the Amaknak Bridge site makes it particularly valuable as a window into the possible causes for cultural shifts that we have observed in the archaeological record in Unalaska Bay.

The Margaret Bay phase is a unique manifestation in the eastern Aleutians and represents a link between the older Anangula phase (beginning around 9,000 years ago) and the later Amaknak and Aleutian phases, which lasted up until contact with the Russian traders.

The Amaknak phase (ca. 3000–1000 cal B.P.) represented the florescence of the Aleutian tradition in terms of the variety and complexity of the toolkit. Elements of the ancient Anangula phase—core-and-blade technology, burins, and the use of stone bowls of volcanic tuff—had finally disappeared by this time. In their stead was a new toggling harpoon technology, along with a wide array of knives and scrapers, stylistically exuberant barbed points, decorated hunting equipment, and other artwork. Umqan, gigantic V-shaped earthworks possibly used for food storage or as burial features, were constructed on the hillsides above village sites. Stone-lined houses and features seen in the Margaret Bay phase become larger and more complex.

The *Late Aleutian phase* began around 1000 cal B.P. and lasted up until Russian contact in the mid-eighteenth century. Late Aleutian-phase occupations are often found on top of large midden mounds first formed in the Amaknak or earlier phases. Deep excavations into these multicomponent middens tended to blur the distinctions between late prehistoric phases and contributed to the mistaken impression of the unchanging nature of the Unangan prehistory.

The late Aleutian toolkit is distinguished by the appearance of abundant ground-slate tools, primarily ulu blades. The appearance of ethnographically known longhouses in a variety of configurations occurs sometime during the Late Aleutian Phase, with some house depressions measuring over 40 meters long (Veltre and McCartney 2001). Defensive sites, such as fortified sea stacks and refuge rocks, were also used during this time, evidence of long-distance warfare and intervillage raiding as coastal niches filled with growing populations along the Pacific coasts (Knecht and Davis 2001). In Unalaska Bay the Late Aleutian phase is best known from excavations at the Amaknak Spit site (UNL-55) or Tanaxtaxak, where a large collection of stone and bone tools was recovered.

KEY SITES

Several sites have played important roles in the development of Aleutian archaeology and we highlight a number of them below.

Anangula and Hog Island (ca. 9000 cal B.P.)

The earliest archaeological sites known from the Aleutians are found on Anangula and Hog Islands. They are small islets in the Bering Sea just offshore from Umnak and Unalaska, respectively. The Anangula Blade site (ABS), the type site for the Anangula phase, was first recognized by William Laughlin and Alan May in 1938 and was the object of long-term excavation and prominent publication (Laughlin 1975; McCartney and Veltre 1996). Until the late 1970s, the Anangula Blade site was heralded as the earliest maritime site in Alaska and one of the earliest sites in eastern Beringia. Although Anangula can no longer claim such temporal priority, the sites' assemblages and features merit close attention. The Hog Island sites (HIS) were first discerned in the 1980s and two were excavated (UNL115 and UNL 318) in 1997 and 2002 (Dumond and Knecht 2001). Both Anangula and the Hog Island sites lack middens and have a thin veneer of artifacts spread over a wide area. They are located well above modern sea level (ABS 16 m above sea level [asl], HIS 19 m asl), which may be due to isostatic rebound. It is widely accepted that by 9000 cal B.P. Umnak and Unalaska were islands; sea level at Umnak was perhaps 2–3 m higher than today's (Black 1974). Thus the Anangulans lived in a maritime environment, although land-fast sea ice may have provided access during winter (Mason 2001). The Anangulan sites are rich in lithics; more than 10,000 were recovered from the ABS (Aigner 1977). Blades, retouched blades, microblades, and transverse burins are prominent in the lithic inventory. Bifaces are entirely absent. Pumice abraders for shafts, ocher grinders, and stone lamps are present. Circular and oval depressions 2–3 m in diameter with some post holes suggest fairly ephemeral structures. The Anangula sites may well have been repeated short-term occupations reflecting specialized subsistence activity. No faunal remains have been recovered.

Sandy Beach Bay, Umnak Island

Sandy Beach Bay is approximately 7 km west-southwest of the modern village of Nikolski on Umnak Island. The main excavation in 1972 opened 26 m² and revealed the remains of five houses. The importance of the Sandy Beach Bay site is its relatively early dating, with the oldest determination at $(5370 \pm 240 \text{ B.P. Penn } 5531, 2\sigma \text{ cal B.C. } 4707\text{--}3693, \text{ Calib } 6.02)$. This placed it earlier than Lower Chaluka and the date was used as an argument for continuity between Anangula and the later Aleutian Period sites (Aigner et al. 1976). Remains of five semisubterranean houses were uncovered. They had wood and possibly bone superstructures. No floor features, bone artifacts, or shell midden lenses were reported.

Chronologically, Sandy Beach Bay is on a par with Level 5 at Margaret Bay. There are large, elongated pointed bifaces made of basalt which bear a strong resemblance to Margaret Bay and also to recent discoveries at the Sanağan site on Akun.

Lower Chaluka, Umnak Island

Chaluka is a large prehistoric site adjacent to the village of Nikolski on the western end of Umnak Island. It is an important site for a number of reasons. It is a deep site, with abundant artifacts and faunal remains (Laughlin 1980). It was excavated in the period after the Second World War by relatively modern methods and it helped establish the overall Aleutian cultural historical sequence and chronology (Denniston 1966). Chaluka also figured importantly in the dual-tradition model versus cultural-continuity debate (McCartney 1984), and it produced a large number of burials which have been the focus of several studies attempting to define the population history of the Aleutians (Coltrain et al. 2006; Hrdlička 1945).

Denniston (1966) subdivided Chaluka into three major components. Our focus here is on Lower Chaluka, which was defined in the 15 m long Trench A, excavated in 1962. Denniston interpreted the ^{14}C dates from the base of Lower Chaluka through Middle Chaluka as forming “a continuous occupation sequence from perhaps 1700 B.C. to perhaps 700 B.C.” (Denniston 1966:87). A striking feature of Lower Chaluka was the remains of three “houses” with multicoursed stone walls. Initially, the houses were only partially revealed in the 2 m wide trench, making it impossible to make a full comparison with the completely excavated structures known from Margaret Bay and the Amaknak Bridge sites on Unalaska. Aigner, however, expanded the lower Chaluka excavation trench, which allowed a more complete description of a Chaluka house. It had a rectangular hearth area with upright stone slabs located “near and partly under one wall,” storage pits, and some areas of stone-covered flooring (Aigner 1978:15.) Quite remarkably, Aigner also reported the discovery of 101 small egg-shaped stones on the house floor—a finding repeated in the Margaret Bay Level 2 house. We have interpreted them as cooking stones (Knecht et al. 2001).

From the present-day perspective, lower Chaluka remains an important site because it shows clear parallels with Unalaska sites, but at the same time shows distinctive local variation. The absence of microblades and blades, the differing architectural details and the apparent lack of paleoenvironmental indicators of the onset of the Neoglacial offer challenging variances in the archaeological record for the Late Anangula and Margaret Bay phases.

Amaknak Quarry Site

The Amaknak Quarry site (UNL-469), discovered in 2003, was tested and partially excavated in 2007 (Rogers et al. 2009). Located on an elevated knoll near the southern tip of Amaknak Island in Unalaska Bay, the site is dated by five radiocarbon determinations between 8040 cal. B.P. and 6740 cal. B.P. Site occupation, therefore, crosses the boundary between the Early and Late Anangula phases of Aleutian prehistory (9000–7000 cal B.P. and 7000–4000 cal B.P., respectively). This date range, and the period following the Early

Anangula occupations, is the least-known segment of the Aleutian tradition (Knecht and Davis 2001), and UNL-469 is the first site from this time to be excavated.

There was no midden accumulation at the site, and no organic remains were found during the excavation. Blades and microblades constitute the basis for lithic industry, comprising 63 percent of recovered tools. Flake tools were also present, as was a single biface fragment. Obsidian is the single most significant lithic material, making up nearly half of the artifacts found at this site. The source of two obsidian samples analyzed by X-ray fluorescence (XRF) spectroscopy was determined to be the Okmok caldera on Umnak Island. Siliceous sedimentary argillite (chert) was favored for blade and microblade production, while obsidian was preferred for retouched flakes, and was also used for the single biface point. Basalt was the least frequent material across all tool categories, utilized for just a quarter of recovered materials.

The investigation concluded that this is essentially a single-component site, with relatively thin occupation layers and few or no structural features (although a possible hearth feature was noted). The site does show broad similarity to other Anangula-period localities (see Aigner 1977; Dumond and Knecht 2001), as well as early presence of bifacial technology.

Margaret Bay Levels 4 and 5

The lower levels at the Margaret Bay site (UNL-48) are key to understanding the cultural historical sequence in the eastern Aleutians. Level 5 (the basal layer), is continuous over the 76 m² of the site excavation, and its lithic industry contained several elements of the earlier Anangula phase. As in the Early Anangula phase, in Level 5 there were remains of stone lamps, pumice abraders, red ocher concentrations and small post holes. Blades, microblades, and microblade cores are the most frequent lithic artifact group, and their morphology and technology are definitely similar to the Anangula sites. Microblades and blades are produced by distinct core technologies and their dimensions have little overlap. Shaped tools include large bifaces, stemmed points, and bell-shaped scrapers which were new additions to the Aleutian sequence. One complete, highly calcined, bilaterally barbed harpoon with a keystone base is the only bone artifact. Thus Level 5 reflects continuity of the technology of the earliest populations of the Aleutians (blades and microblades) but also has elements (bifaces, stemmed points, scrapers) which proliferate in the later part of the sequence (Figure 11.2).

Level 4 contains portions of a large shell midden, which has preserved an impressive and diverse bone and ivory industry, including bird-bone eyed needles, throwing-board ivory pins, prong fragments, bipointed gorges, and composite fish-hook barbs. Perhaps most significant was a series of 24 bilaterally barbed harpoons, most with cruciform line guards. These find clear analogs from Ocean Bay assemblages in Kodiak.

Amaknak Bridge

The Amaknak Bridge site (UNL-50) is located on Amaknak Island, in Unalaska Bay. The prehistoric settlement was located on a bedrock knoll overlooking Amaknak Channel, which lies to the north and east. The site was discovered during the Second World War, and was first excavated in 1977. Ongoing archaeological investigations uncovered various parts of the settlement, until the final projects of 2006 and 2007, which excavated the site to near totality (Knecht and Davis 2008; Rogers 2011; Rogers and Anichtchenko 2011). The site is significant for the stone-walled semisubterranean houses and elaborate hearth complexes found there, as well as for the extensive collections of both lithic and bone tools, and a carved whalebone mask (Figures 11.3, 11.4).

Extensive, deeply stratified midden was well preserved at the site, which was continuously occupied for approximately 1,000 years. The settlement has been dated by an array of 26 radiocarbon dates from charcoal samples collected between 1977 and 2007, with dates ranging from 3470 ± 70 B.P. (Beta-184633, 2σ 3922–3565 cal B.P.) to 2450 ± 40 B.P. (Beta-222047, 2σ 2618–2358 cal B.P.). Site occupation, therefore, occurred during the mid-Holocene period of global cooling known as the Neoglacial, which lasted from approximately 4,700 to 2,500 years ago. Artifacts, structures, and faunal remains of ice-obligate species from the site have been interpreted as evidence of cultural change and adaptation to colder climate conditions during the Neoglacial (Crockford and Frederick 2007; Knecht and Davis 2008).

In the prehistoric cultural sequence for the eastern Aleutians, the period of site occupation falls across the late Margaret Bay phase (ca. 4000–3000 cal B.P.) and the early Amaknak phase (ca. 3000–1000 cal B.P.) (Knecht and Davis 2001). Subsistence was almost entirely marine-based, with extensive utilization of fish, seabirds, and sea mammals. Although microblades and cores were present at the settlement, bifacial technology is clearly the basis for lithic industry at this site.

OUTSTANDING ISSUES IN EARLY ALEUTIAN ARCHAEOLOGY

Several issues remain for archaeologists of the early Aleutian period to work out. Here are some we consider to be the most important.

Anangula Origins

The Anangula-phase sites on Umnak and Unalaska present a number of unresolved questions for Arctic archaeologists. What are their origins, what was their inhabitants' way of life, how were they affected by sudden climatic changes and major volcanic

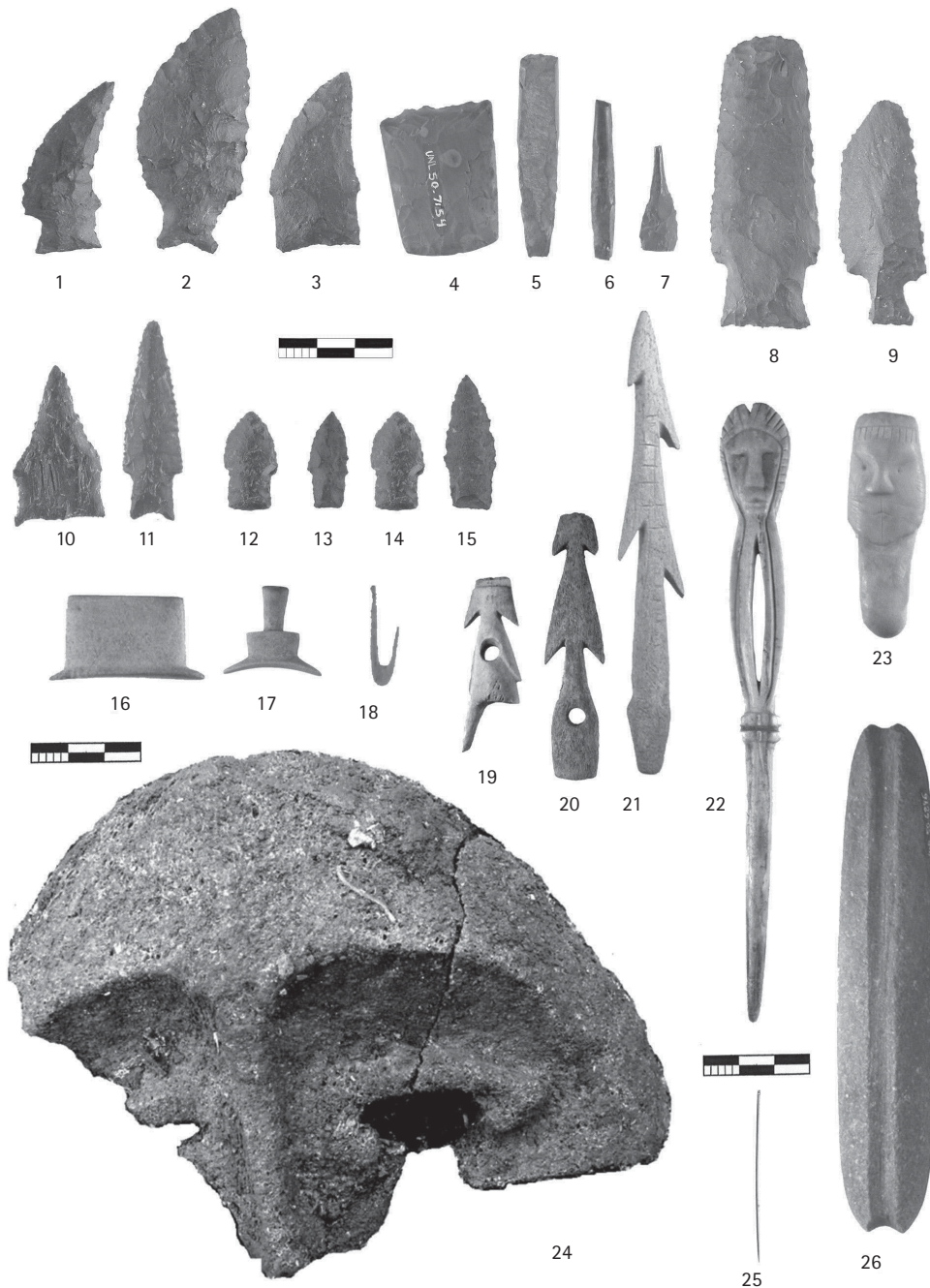


FIGURE 11.3 Artifacts from Amaknak Bridge site (UNL 50), Late Margaret Bay phase. (1–3) bifacial, asymmetrical stemmed knives; (4) adze with polished ventral surface; (5–6) polished chisel; (7) polished borer; (8–9) bifacial stemmed knives; (10) pointed knife; (11–15) bifacial, broad stemmed points; (16–17) labrets; (18) fish hook; (19) toggling harpoon; (20–21) harpoons; (22) anthropomorphic pin; (23) anthropomorphic pendant; (24) whale-bone mask; (25) eyed needle; (26) grooved netsinker.

Photographs: (1–23, 25–26) Richard Knecht; (24) Jason Rogers

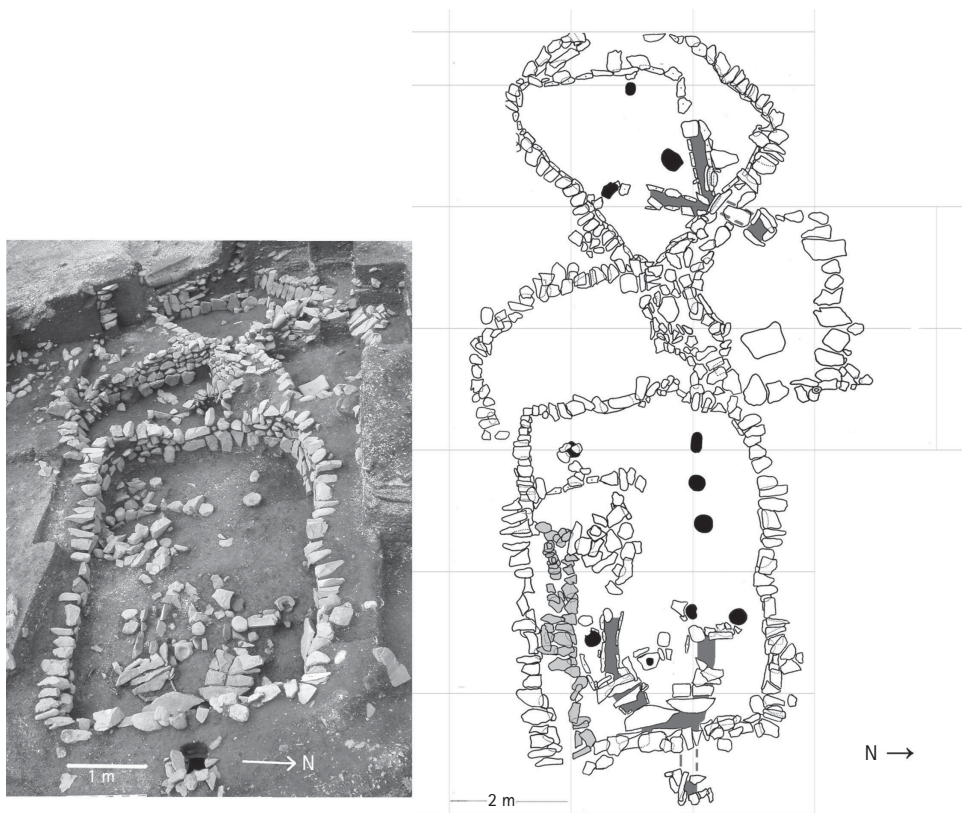


FIGURE 11.4 Structure 7 complex, Amaknak Bridge site (UNL-50), Late Margaret Bay phase.

Note: chimneys and connected subfloor, stone-lined trenches marked in dark gray. Photograph by Richard Knecht, drawing by Kevin Porter

eruptions? And, yes, why didn't they have bifacial tools? Their origin may lie with the Paleoarctic tradition as Hatfield (2010) recently suggested. Similarly, Carlson looked to "hunting peoples of Central Alaska" (Nenana tradition) for the derivation of the first maritime peoples along the coast of British Columbia (Carlson 1998:30). Closer to the Aleutians but dated about a millennium earlier, the Ugashik Narrows site, 41-Uga-1, reported by Henn (1978), shows several similarities to the Anangula material including transverse burins, blades, microblades, and pebble tools. Major differences, however, are the predominance of wedge-shaped microblade cores and clear presence of bifacially chipped tools. Thus, there is no clear derivation of the Anangula industry and we can only point to some modified Paleoarctic ancestor.

The subsistence practice of the early Anangula folk has almost universally been considered to have been focused on maritime resources (Aigner 1976). Considering that the sea level was near modern levels and that Unalaska and Umnak were islands (Black 1974), supposing a maritime economy is very reasonable. If the Anangula lithics were found deep in the interior of Alaska, however, they would not appear out of place. Except

for the stone lamps and netsinkers, the assemblage has no clear maritime character. In fact the presence of microblades, by far the most numerous category of artifact, suggests that they served as insets in darts or arrows, weapons much more frequently associated with terrestrial hunting. Further evidence of small darts or arrows is the presence of narrowly grooved pumice abraders. Because the bow and arrow are rarely used as a hunting implement for marine mammals, it seems more likely that it was used on Umnak and Unalaska to hunt middle- to large-sized terrestrial game such as the caribou. Goebel (2002:127) makes a particularly relevant observation concerning late Upper Paleolithic hunter-gatherers in Siberia, where microblades are usually associated with highly mobile hunter-gatherers, and at their sites “debris accumulations are small, dwellings are ephemeral, and key locations were repeatedly utilized.” This is a nearly perfect description of the Anangula-phase sites. If landfast sea ice provided a route for pedestrian hunter-gatherers as far as Umnak, then what we may be seeing in the excavations are the remains of late Paleoarctic terrestrial game hunters. This subsistence issue, of course, will never be resolved until faunal remains are recovered from some future excavation.

Ancient and Modern mtDNA and DNA

Just within the last decade, provocative and increasingly consistent data from modern and ancient mitochondrial DNA (aDNA) and nucleic DNA has given evidence of Aleutian population history from its earliest times up to the historic period. Much of this recent work is summarized in Crawford, Rubicz, and Zlojutro (2010), and is also incorporated in Raghavan et al. (2014). One of the first important findings pointing to Aleut origins came from a study of the mtDNA from 179 modern-day Aleuts from Atka, Unalaska, Umnak, St. Paul, and St. George, which found that their closest relatives were from Chukotkan populations and not from Native American or Kamchatkan groups (Rubicz et al. 2003: 809).

Recent reports of Paleoeskimo mtDNA and aDNA sequenced from a human hair found in a permafrost Saqaaq archaeological context in western Greenland (Gilbert et al. 2008; Rasmussen et al. 2010) provide an intriguing link to the ASTt archaeological character of the Margaret Bay phase in Unalaska. Gilbert et al. (2008:1788) identified the D2a1 haplogroup from the Saqaaq hair. It is closely related to the relatively common D2a1a haplogroup found among modern Aleuts. No other modern American Arctic or Subarctic group bears this similarity. The genetic and archaeological evidence suggests that the originators of the ASTt came from northeast Siberia sometime between 4,400 and 6,400 years ago and traveled east across the high Arctic all the way to Greenland. Other populations traveled south along the western Alaskan margin to the Alaska Peninsula and ultimately, we believe, the Aleutians. No close genetic connection with Inuit or Na-Dene populations was indicated by the mtDNA analysis. The Margaret Bay Level 2, which reflects the ASTt influence or intrusion, is dated to between 3214 and 3681 cal B.P. Four to five centuries earlier, ASTt peoples are known to have occupied the base of the Alaska Peninsula (Dumond 2005).

Zlojutro et al. (2006) have attempted a synthesis of genetic, morphological, and archaeological data in order to model possible scenarios of Aleutian population history. Perhaps the most promising of Zlojutro et al.'s models has the earliest inhabitants of the eastern Aleutians containing both the D2 and A2a mitochondrial lineages. After approximately 6000 B.P., a well-developed maritime adaptation led to westward expansion to the central Aleutians. Evidence of a stable and actually growing population at this time during the Late Anangula phase comes from mtDNA analysis as well as from archaeological data. From mtDNA samples taken from contemporary populations in the Aleutians, distinct subclade clusters, identified by reduced median network analysis, suggest population expansion at an estimated age of 5400 B.P. (Zoluto et al. 2006:455). This dating for the appearance of the distinctive Aleut mtDNA subclades is close to the oldest archaeological levels at Margaret Bay. In these levels, evidence of shell middens, harpoons, and marine fauna attest for the first time in the Aleutians to a well-established maritime economy. Recent archaeological work in the central Aleutians—the Adreanov and Rat Islands—lends support to Zlojutro's scenario. West et al. (2010) summarize recent work on Adak Island and Funk (2011) reports on recent work for the Rat Islands. There is no evidence for occupation in the Central Aleutians before 6,000 years ago and hence the genetic and archaeological records are in agreement concerning the chronology of the westward expansion of Aleutian populations.

The diverse subclade A2a mtDNA component, well represented in the eastern Aleutians, is shared with Athapaskan populations, and its presence may reflect continued or intermittent contact with mainland Alaskan groups (Crawford, West, and O'Rourke 2010:713). We note here an XRF analysis of an obsidian blade from the Amaknak Bridge site which was sourced to Wiki Peak located in the Wrangell Mountains inside Wrangell–St. Elias National Park (Jeff Rasic personal communication). The airline distance between Unalaska and Wiki Peak is more than 1,600 km. Although we can't conclude that movement of material culture was accompanied by genetic exchange, the XRF analysis sheds new light on the extent of the wide horizons of the Aleutian world.

Sequence Continuity

The subject of continuity of occupation in the Aleutians has been an important question since the earliest archaeological research in the region. On the basis of investigations in the late nineteenth century, William Dall proposed a three-period chronology, indicating basic cultural continuity from the earliest human occupation until European contact (Dall 1877). Waldemar Jochelson, the lead anthropologist of the 1909–1910 Kamchatka-Aleutian Expedition, stressed that the early inhabitants must have had sophisticated technology and subsistence adaptations simply to survive in the region, and therefore saw considerable continuity and stability in the Aleutian population over a tremendously long period of time (Jochelson 1925).

Excavations at Chaluka (Umnak Island) in the late 1960s and early 1970s showed a clear, virtually uninterrupted sequence from about 4000 B.P. to the present (Aigner 1978; Turner et al. 1974), and the chronology was later extended to include Sandy Beach Bay, dating to about 6000 B.P. (Aigner et al. 1976). Although the poorly reported Anangula Village site was proposed as an intermediary between the Anangula Blade site (ca. 9000 cal B.P.) and later sites such as Chaluka and Sandy Beach Bay (Laughlin 1975), a stubborn gap in the chronological sequence remained between ca. 8000 and 6000 B.P.

Allen McCartney (1984) supported the “basic relatedness of Aleut midden site cultures,” but questioned the relationship of the midden cultures to Anangula. McCartney’s “dual-tradition model” suggested that the difference in lithic technologies between Anangula and later sites was a reflection of “distinctive cultural traditions . . . not closely related” (1984:124), and suggested a hiatus of approximately 3,500 years between posulated Anangula and Aleutian traditions. Nonetheless, strong arguments for cultural connections and continuity from Anangula forward were proposed by a number of other researchers (e.g., Laughlin 1980).

Further evidence in favor of the continuity argument came to light in the 1990s as a result of excavations around Unalaska Bay, particularly those at the Margaret Bay site on Amaknak Island (Knecht et al. 2001). The lower levels of Margaret Bay, dating to ca. 6000 cal B.P., contained substantial amounts of microblades, leading Knecht and Davis (2001) to propose a “Late Anangula phase” for the regional chronology, and also adding bifacial technology to the existing core-and-blade lithic industry of the Anangula tradition. The apparent (and persistent) chronological gap between 8000 to 6000 B.P. was explained by some researchers as the result of catastrophic volcanism (e.g., Dumond and Knecht 2001; Mason 2001). Although the Makushin (Unalaska Island) caldera-forming eruption of ca. 8800 cal B.P. undoubtedly impacted resident human populations, they were apparently not altogether wiped out. The chronological gap was finally substantially filled by excavations at the Amaknak Quarry site, dating to between 8000 and 6800 cal B.P. (Rogers et al. 2009). This site demonstrates technological similarities with Anangula and Hog Island sites, as well as the emergence of bifacial technology (seen in abundance at Margaret Bay). Bifaces, which to the best of our knowledge appear in the archaeological record just at this time, increase steadily over time until the core-and-blade format finally disappeared during the Amaknak phase (after 3000 cal B.P.) (Knecht and Davis 2001:278).

Connections to Kodiak

Initial settlement on Kodiak seems to have occurred around 7500 cal B.P. with the earliest-known site dating from around 7000 cal B.P. (Fitzhugh 2004). It seems possible that initial settlers on Kodiak may have origins or at least shared ancestry with late Anangula peoples, however archaeological evidence from that time period remains very thin. As noted earlier, there are intriguing similarities in artifact assemblages from these areas dating from around 5000–6000 cal B.P.; core-and-blade technology,

stemmed projectile points, eyed needles, and bilaterally barbed harpoon points with cruciform line guards are found in both regions. Finds of ground-slate point fragments as well as ground-jet artifacts in the lower levels of the Margaret Bay site minimally indicate early and sustained contact between progenitors of the Alutiiq/Sugpiaq peoples of the Gulf of Alaska and the Unangam people of the eastern Aleutians. But there are also important differences in the early prehistoric assemblages from these areas that suggest parallel but diverse cultural trajectories. On Kodiak, core-and-blade technology disappears around 5000 cal B.P., whereas in the Aleutians it persists for another two millennia (Hausler-Knecht 1993). On the Kodiak Archipelago, except for the manufacture of adze blades, chipped stone technology in general is discarded about the same time in favor of ground slate projectile points and knives. Technological similarities in some artifact types between the Gulf of Alaska and the Western Aleutians persist throughout the prehistoric sequence, however differences on the assemblage level suggest that the ethnic boundaries between these regions may be very ancient.

NEOGLACIAL EFFECTS

The Neoglacial was a period of global cooling beginning in the mid-Holocene and lasting more than 2,000 years (ca. 4700–2500 B.P.) (Crockford and Frederick 2007). Arctic regions of the Northern Hemisphere were significantly impacted by climatic effects of the Neoglacial. Climate reconstructions based on proxy indicators demonstrate a precipitous drop in global temperatures around 3000 B.P. This period also marks a transitional boundary for many Arctic and Subarctic cultures in terms of subsistence and technology (Knecht and Davis 2005:186, with refs). Excavations at the Amaknak Bridge and Margaret Bay sites have significantly improved our knowledge of mid-Holocene climatic changes (especially the Neoglacial), and human responses to those climatic shifts.

Faunal material recovered from the Margaret Bay site included several key ice-edge species such as polar bear, walrus, and ringed seal (Davis 2001). The presence of pagophilic fauna indicates a sea ice habitat extending to the vicinity of Unalaska Island during the Neoglacial. Analysis of material from the Amaknak Bridge site identified both temperate and pagophilic species and further research has great implications for sea-mammal distribution patterns (and possibly for the human history of the Bering Straits and high arctic regions). Juvenile remains of two key pagophilic species, bearded seal and ringed seal, provide “incontrovertible evidence” of regular summer sea ice in the vicinity of Unalaska (Crockford and Frederick 2007:704). These species in particular are dependent on sea ice for birthing, weaning their young, and molting. Although animals of all ages were harvested, 49 percent of the bearded seal remains from the Amaknak Bridge site were of newborns or newly weaned young less than two months of age. Remains of ringed seal, a species strongly identified with sea ice virtually year round, make up the second-largest category of mammals recovered. Crockford and Frederick (2007) have used this evidence to argue for substantial expansion of sea ice in the Bering

Sea during the Neoglacial, potentially altering the distribution of North Pacific pinipeds and cetaceans. These data and suggestions have considerably revised previous assumptions that the Aleutian climate has been substantially unchanged over the last 10,000 years (i.e., Aigner 1976).

Colder climates may also have resulted in architectural adaptations during this period. The use of stone-house walls and foundations is known from only three sites in the Aleutians, all with dated occupations during the Neoglacial: Chaluka on Umnak Island and the Margaret Bay and Amaknak Bridge sites on Amaknak Island (Rogers 2011). Walls, lining oval or circular pits, were constructed from several courses of angular bedrock topped with multiple courses of subangular beach cobbles. Slab-lined hearths were built into the walls. Among the most intriguing and unprecedented discoveries at Margaret Bay and the Amaknak Bridge sites are a complex of features centered on the stone hearths. In addition to the hearths themselves, the assemblage includes subfloor channels within the houses, chimneys, and stone-lined shafts leading from outside the structure through the wall and into the fireplace. Channels and other hearth elements are interpreted as “a complex of features representing a remarkably sophisticated heating system . . . the hearth channels funneled heat, perhaps even steam, upward from the hearth under the floor” (Knecht and Davis 2004:54). The architecture of these sites, which has no analog or parallel in the North American Arctic outside this region and period, was likely a response to the very cold climate conditions of the Neoglacial.

SUMMARY

The first 6,000 years of Aleutian prehistory can be summarized as follows. Genetic analysis based on samples of contemporary Unangan mtDNA suggests that Aleutian populations originated in Siberia. The initial Aleutian populations (Anangula phase) probably descended from Paleoarctic groups who reached the Alaska Peninsula by 10,000 B.P. These initial inhabitants do not appear to have moved down the chain beyond Umnak and may have focused on terrestrial game as well as marine resources. A major cold phase around 8200 cal B.P., in addition to caldera forming eruptions on Umnak and Unalaska, may have caused temporary population relocation, but overall the early Aleutian populations were resilient, and ¹⁴C dating as well as the archaeological record strongly suggest continuity of tradition. By 6000 cal B.P., during the Late Anangula phase, the maritime subsistence adaptation was well developed and populations expanded to the central Aleutians and beyond. During the ensuing Margaret Bay phase about 3500 cal B.P., there appears to have been an influx of Arctic Small Tool tradition elements on Unalaska, which may well reflect the westward-most fringe of this archaeological horizon that extends north and east all the way to Greenland. At the same time the beginning of widespread Neoglacial climatic change created a greater extent of sea ice in the Bering Sea adjacent to the eastern Aleutians and a consequent change in diet and technology. Settlements in Unalaska and Umnak grew and permanent

semisubteranean dwellings appear. The first evidence of labrets and art appear at this time. By the end of the Margaret Bay phase at 3000 cal B.P., large, multiroom structures appear at the Amaknak Bridge site. Contact all the way to the Wrangell Mountains is shown by presence of exotic raw material.

Thus the early Aleutian record is one of movement, widespread contact, and profound culture change.

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CHAPTER 12

MARITIME ECONOMIES OF THE CENTRAL GULF OF ALASKA AFTER 4000 B.P.

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INTRODUCTION

THE coast of southern Alaska stretches 3,600 km from the Alexander Archipelago's labyrinth of protected waterways to the windswept islands of the Aleutian chain. Along this great arch of the North American continent misty rainforests give way to grassy meadows, and sheltered shores to storm-pounded coastlines. The Central Gulf of Alaska lies at the convergence of these environments—between the Copper River delta and the southern Alaska Peninsula. Here, the continental shelf widens, major rivers empty into the ocean, and frequent, powerful storms create one of the most productive marine ecosystems on Earth.

This dynamic environment contains four distinct regions, Prince William Sound, Cook Inlet, the Kodiak Archipelago, and the Pacific coast of the Alaska Peninsula, each with unique topography and natural resources. Prince William Sound is a wide, forested, embayment rimmed by glacial fjords and steep, snow-capped mountains. Many islands and a complex coastline reflect the sound's ongoing glacial history. Numerous, active mountain and tidewater glaciers remain a striking part of the landscape. Here, sea mammals, marine fish, migratory birds, and salmon abound, and small numbers of terrestrial furbearers are available. The inhabitants of the Sound also accessed resources from interior and southeast Alaska through trade with neighbors.

West of Prince William Sound lies Cook Inlet. A late Pleistocene moraine divides this large glacial fjord into the lower inlet, with a maritime environment similar to that of Prince William Sound, and the upper inlet, with a more continental climate. The upper Inlet's shores are fronted by shallow, treacherous mud flats, revealed daily by some of

Alaska's largest tides, while the lower Inlet, just south of Kachemak Bay, has a convoluted coast. Spruce forests grow around the inlet's shores, but yield to brushy uplands and coastal meadows to the west. Cook Inlet's natural resources include a wide range of terrestrial mammals, marine mammals, salmon runs, and migratory waterfowl. Through mountain passes, Cook Inlet peoples had contact with the Bering Sea and interior Alaska.

Like outer Cook Inlet, the Kodiak Archipelago has a deeply embayed coastline and numerous small islands, but its mountains are low and lack substantial glaciers. Kodiak's protected waterways provide exceptional habitat for marine resources, and its short, shallow rivers support huge quantities of Pacific salmon. Terrestrial resources are more limited. There are just six indigenous land mammals and only the northernmost islands are forested. Grassy meadows, dense brush, and wet tundra cover the remainder of the islands.

Steep, volcanic mountains back the Alaska Peninsula's complexly divided Pacific coast. Despite the availability of marine resources, there is little flat ground along the shore and few major rivers. Native people settled this coast, but also looked west to the peninsula's interior. Low mountain passes provide access to a broad, marshy, coastal plain, dotted with lakes and cut by meandering rivers. Here people encountered caribou herds, furbearers, waterfowl, fresh water fish, massive salmon runs, and peoples and products of the Bering Sea.

This range of natural environments suggests the potential for great variation in human adaptations across the Central Gulf of Alaska. Today, four regional Native corporations manage the Central Gulf's lands and resources for a culturally diverse set of Athapaskan, Sugpiaq, and Yupik tribal communities. Yet despite this diversity, ethnographic and archaeological data illustrate a broadly cohesive cultural history. In the late eighteenth century, European traders encountered sizeable Sugpiaq communities throughout the Central Gulf, in all regions except upper Cook Inlet.¹ Known today as the Alutiiq,² these people lived in large, sedentary coastal communities led by hereditary chiefs. Skilled mariners, they subsisted largely from the sea and traveled great distances to harvest resources, trade, and wage war. During the summer and fall, the Alutiiq procured and processed huge quantities of food and raw materials, which they stored for sustenance, craft production, exchange, and ritual use. In winter, people invested these stores in their communities, hosting large festivals that honored ancestors, thanked the spirit world, and shared wealth to insure future prosperity.

Archaeologists have long debated the origins of the Alutiiq, their relationships to neighboring peoples, and the forces that promoted the development of their social system. The Central Gulf's archaeological record stretches back nearly 8,000 years and indicates that skilled mariners, probably from Western Alaska, settled the region. Although scholars have considered the colonization of the region and the organization of its early societies, the origins and genesis of later, more complexly organized societies has generated much research and debate.

Some have argued that late prehistoric Alutiiq culture reflects the movement of Eskimo peoples into the Central Gulf about A.D. 1100, introducing a new language,

technologies, and social customs to existing societies (Dumond 1987; Maschner et al. 2009). For these scholars, the presence of an Eskimo language in the maritime environments of southern Alaska, technologies that link Bering Sea and Pacific peoples, and a late prehistoric rise in population suggest ancestral connections with northern peoples.

Yet, as archaeological data accumulate, a picture of broad, regional, cultural continuity has emerged. These data indicate that the deep cultural history of the Alutiiq region is cohesive across space and time. Each major prehistoric cultural tradition is represented in each region of the Central Gulf—beginning with the early mobile foragers of the Ocean Bay tradition, and moving through the seasonally sedentary village communities of the Kachemak tradition to the large, ranked societies of the Koniag tradition. From earliest occupation, the distribution of prehistoric cultures mimics the historic distribution of Alutiiq peoples (Clark 1997:84) illustrating a broadly unified evolutionary trajectory.

This pattern indicates both enduring cultural ties across the Central Gulf of Alaska and a persistent population. Although not every area was continuously or heavily occupied (Clark 1997:69; Dumond 1998:192–193; Workman and Zollars 2002:46; Yarborough and Yarborough 1998:138), archaeological data suggest that the prehistoric population was substantial enough to perpetuate a continuous sequence of cultural development for over 7,500 years. Although debate continues, many researchers recognize cultural continuity in the archaeological record and argue that Alutiiq societies evolved from the Central Gulf's older cultures in response to changing demographic, environmental, and social circumstances (Fitzhugh 2003; Yarborough and Yarborough 1998).

What were the forces that shaped prehistoric societies? Over more than 7,500 years, prosperous, permanent villages developed from small, mobile groups, through human ingenuity—the ability to harvest resources with increasing efficiency and to manage inevitable fluctuations in the availability of foods and raw materials in the region's productive but dynamic environment. Changing environmental conditions, population growth, technological innovation, and interaction with other peoples continuously shaped ancient societies into the powerful chiefdoms recorded historically. This chapter examines these processes in the last 4,000 years of Central Gulf prehistory. It focuses on Kodiak and Prince William Sound, two regions that suggest the *in situ* evolution of Alutiiq societies.

KODIAK PREHISTORY

Until recently, archaeologists knew little about Kodiak prehistory in the fourth millennium B.P. Sites from the centuries succeeding the relatively well-documented Ocean Bay tradition were poorly represented in surveys. Archaeologists hypothesized that the archipelago was minimally settled after 4000 B.P., perhaps due to regional volcanism (Knecht 1995:107) or a broad population redistribution due to changing foraging patterns in the colder, wetter, Neoglacial era (Fitzhugh 2003:230).

Recent research in the Kodiak region, however, has changed this picture. Sites assigned to the early phase of the Kachemak tradition—Kodiak's middle prehistoric era—now appear to be present in substantial numbers. Deposits are typically well buried, with few surface features and little organic preservation. Moreover, they contain the small, lugged, chipped stone points, slate implements, and abundant cobble tools common to later assemblages. As such, Early Kachemak sites are simply hard to identify without a carbon date. Based on the relative frequency of these sites (14 in Chiniak Bay alone), their ubiquitous presence capping older deposits, and their numerous technological ties to Ocean Bay II assemblages, it now appears that Kodiak societies grew seamlessly from those of the proceeding Ocean Bay tradition, with no major break in population (Clark 1997:83–84). The lack of Early Kachemak sites in earlier surveys reflects both a sampling problem and a change in economic strategy. Data now illustrate that the fourth millennium B.P. was a time of intensified cod and salmon fishing and fish storage (Steffian et al. 2006:120–121). The transition from Ocean Bay to Early Kachemak reflects a shift from a needs-based to a surplus-based harvesting strategy—a focus that becomes the foundation for subsequent economies.

The causes of this economic change are unknown. Archaeologists point to a number of likely factors, including depression of the sea mammal population (Kopperl 2003) and a cooling environment with increasing constraints on winter harvesting (Steffian et al. 2006:123). Whatever the reasons, there is a dramatic change in the archaeological record about 4000 B.P., marking the start of the Early Kachemak era.

Middens of the Early Kachemak are black from the charcoal of ancient fires, riddled with large pits, and contain new varieties of fishing and processing tools. Net sinkers appear in the archaeological record, indicating the mass capture of fish, as do ulus, an easily sharpened fish-processing tool. Similarly, assemblages show an emphasis on heavy, less-portable cobble implements—cobble scrapers, plummets, and U-shaped abraders, and there is greater intersite variability in assemblage composition. Some Early Kachemak tools are designed for specific functions rather than versatility, and subsets of the toolkit occur in specific settings. At Bruhn Point, a small site by the mouth of a salmon stream, net sinkers and ulus dominate the assemblage. In contrast, at Zaimka Mound, a large site in a mid-bay environment, plummets, slate points, split cobble scrapers, and U-shaped abraders are predominant. Such finds suggest that people were conducting specialized activities including the harvesting, processing, and storage of quantities of marine and anadromous fish.

Structural data indicate that Kodiak's Early Kachemak residents lived in oval, single-roomed, semisubterranean sod houses (Steffian et al. 2006:111), with level entrances and stone-lined hearths set slightly off to one side of the structure's center. Additionally, people built a variety of special-use features. Large circular structures with deep, charcoal-filled floors and a variety of pits lined with pebbles and charcoal are common finds (Steffian et al. 2006:108). Many of these pits were probably fish-processing structures. At Uganik Island's Horseshoe Cove site, cod remains dominated the Early Kachemak midden (Foster 2005).

Furthermore, although the presence of sea-mammal hunting gear suggests that Early Kachemak foragers were skilled mariners, the limited frequency, use, and distribution of nonlocal raw materials suggest infrequent trade with mainland societies (Steffian and

Saltonstall 2005:24). Foreign materials include a small number of tools stylistically similar to those manufactured by peoples of the Arctic Small Tool tradition (ASTt) found on the northern Alaska Peninsula in the first half of the fourth millennium B.P. (Dumond 1998), and in Kachemak Bay between 4440 and 3805 cal B.P. (Workman and Zollars 2002:40–42). However, these tools are never present on Kodiak as assemblages. They occur as unique objects within large, coherent Early Kachemak assemblages, indicating collection or trade (Steffian and Saltonstall 2005:24). While ASTt peoples inhabited adjacent areas, they do not appear to have colonized Kodiak.

In sum, the use of permanent sod structures, the construction of formal processing and storage features, the reduced portability of assemblages, limited long-distance trade, and the importance of storage all point to a decrease in residential mobility during the Early Kachemak. The fourth millennium B.P. appears to have been a period of localized economic intensification and population growth on Kodiak Island.

Evidence of the Kachemak tradition after about 2,700 years ago becomes ubiquitous. Sites of varying size appear in hundreds of coastal and inland locations, and many contain deep accumulations of midden surrounding clusters of single-roomed, semi-subterranean sod houses. Settlements contain from one to over 30 structures, as well as external pits and smaller structures (Fitzhugh 2003:181). Archaeologists assign these sites to the Late Kachemak phase.

Settlement data suggest that by the Late Kachemak, Kodiak's population had grown substantially, limiting opportunities to move in response to economic need and forcing people to diversify economic practices. People of this phase settled a broader range of environments. In addition to living along protected waterways, they built sizeable villages along salmon streams, on the shores of Kodiak's major lakes, and even on the outer coast (Steffian et al. 2015). In the Uyak Bay and Karluk River region, a dichotomy between large settlements in bay mouths and small settlements in inner bay and riverine settings suggests logistical foraging, with people dispersing annually from centrally located winter villages to a set of seasonal extractive camps.

Like Early Kachemak settlements, Late Kachemak settlements had a variety of permanent features, including houses, exterior hearths, pits, processing structures, and storage structures. Most Late Kachemak houses are less than 25 meters square with a narrow, sunken entrance tunnel designed to retain heat (Steffian 1992b). A central, slate slab hearth provided heat and was often encircled by small cooking features including pits and clay-lined basins. Benches for sitting and sleeping occur along house walls, and alcoves are occasionally present. People built similar houses in a variety of sites in coastal and inland locations. At the Outlet site on the upper Buskin River, residents built substantial, permanent facilities at a seasonal settlement, suggesting their intent to return (Figure 12.1).

The development of more efficient foraging technologies accompanied the expanded use of environments. Although net fishing began in the Early Kachemak, it became popular in the Late Kachemak. Archaeological data suggest that Kachemak foragers spread nets across streams to trap salmon. Along the Karluk River, Late Kachemak sites occur beside deep water and contain hundreds of small, notched pebbles net weights.

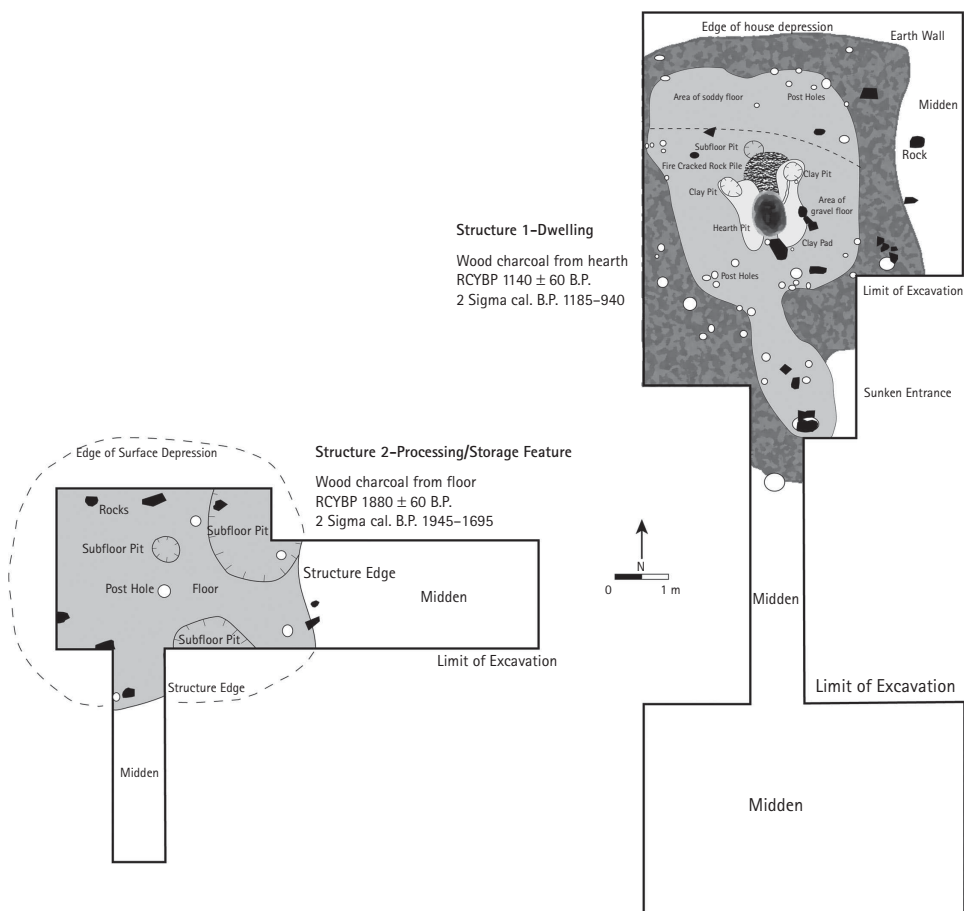


FIGURE 12.1 Late Kachemak house and storage feature from the Outlet site (KOD-561), an inland settlement on the Buskin River.

Drawing by Amy Steffian and Patrick Saltonstall

Extensive interregional trade also flourished in the Late Kachemak. With settlement mobility curtailed, Kodiak's residents moved goods to people. The abundance, variety, and widespread use of nonlocal antler, ivory, coal, red shale, and volcanic rocks record trade with the mainland (Steffian 1992a). Such exchanges likely created lasting social ties that provided access to resources in an increasingly populated landscape. People crafted many nonlocal materials into small carvings and items of personal adornment, particularly labrets. The distributions of labret styles suggest the growth of social networks and perhaps territoriality, as labret styles cluster regionally (Steffian and Saltonstall 2001).

Another characteristic of the Late Kachemak phase is elaborate treatment of the dead. Kodiak and Kachemak Bay area villages consistently hold scattered cut, burned, and broken human bones as well as formal burials. The presence of modified human bones may indicate social violence. Human bones with defleshing and disarticulation cut marks appear in unburied contexts, scattered in midden. In contrast, purposeful

burials usually occur in pits and hold more than one individual. These multiple interments likely represent family crypts, as archaeologists have documented evidence of sequential interment and postburial bone harvesting. Like regional patterning in labret styles, crypts link extended families to villages and regions, suggesting the development of social networks and control of the landscape (Simon and Steffian 1994:90).

In the Kachemak tradition, therefore, an intensification of social relations followed that of economic production. A similar cycle occurred in the late prehistoric era. Starting about 950 years ago, settlement patterns and the configuration of villages changed rapidly, transforming societies into those of the ethnographically recorded Koniag tradition. Archaeologists have begun referring to the period between about 950 and 650 cal B.P., as the Transitional Kachemak.

Structures are one of the most notable features of Transitional Kachemak sites. From the surface, each structure appears as a cluster of depressions, with a large central depression surrounded by smaller depressions (Figure 12.2). Excavations illustrate that the peripheral depressions are a mix of side rooms, chambers attached by tunnels to the central depression, and unattached storage pits. The central depressions are similar in size and construction to single-roomed Kachemak dwellings, but they were used for a new set of functions. In the Late Kachemak, fish processing and storage took place in special structures outside of houses. In the Transitional Kachemak, these activities moved into the central room of residents' homes. Tiny side rooms served as sleeping and sweat bathing areas for small numbers of people suggesting that although transitional dwellings were multiroomed houses, they were still single-family homes. The movement of activities once conducted in communal space into private homes suggests an increasing focus on protecting and owning food stores.

Salmon are a particular focus of this activity. Transitional sites occur in a wide variety of settings. However, they are conspicuous at lake outlets. Throughout the Kodiak Archipelago, there are massive transitional settlements, some with over 40 structures, flanking the upper courses of major anadromous streams and their confluence with lakes (Steffian et al. 2015:45). Here large groups gathered to harvest quantities of fish.

Importantly, archaeological evidence of competition and territoriality accompanies evidence of controlling stores. The first defensive sites found on Kodiak—settlements on rocky islets (Fitzhugh 2003:186)—appear in the transitional era, and there is an association between the location of Transitional Kachemak settlements and the major petroglyph clusters of Cape Alitak. Rock-art locales occur on the shoreline directly below settlements of this age, perhaps to signal family affiliation with productive marine hunting and fishing locales.

Despite increases in site size, the number of houses in certain settlements—and the size of houses—all potential indicators of increasing organizational complexity, transitional-era sites lack evidence of social differentiation. Although the excavated sample from this era is small, sites contain largely utilitarian artifacts, limited use of nonlocal materials, and only a few new tools. The tools are the same as those found in Late Kachemak assemblages with the addition of a few Koniag forms. For example, Three Saints Bay-style ground points indicative of the Late Kachemak tradition (Clark 1970:80–81) occur with long, medially ridged, diamond cross-section slate point typical of the Early Koniag (Knecht 1995:237–243). In short,

increases in house size are not accompanied by an elaboration of materials culture. As in the Early Kachemak, the focus of these two centuries appears to be economic production.

It should be noted that archaeologists studying the Kachemak-to-Koniag transition have used different data sets in assigning cultural affiliations to sites of this period. As transitional era artifacts appear largely Kachemak, house forms appear Koniag, and carbon dates could fall in either tradition, deposits of a similar age and contents have been assigned to different traditions. This semantic problem obscures similarities in sites of this period and the fact that they contain elements of both traditions. The set of material traits once thought to indicate an influx of people from the west—thick gravel-tempered pottery, base-faceted triangular slate endblades, grooved splitting adzes, cold-trap structure entrances, and evidence of sweat bathing (Dumond 1987:46)—now appear to have been adopted over centuries. They are not coeval occurrences, suggestive of invasion or resettlement, but part of a continuum of widespread adaptive changes (Mills 1994:130).

By about 650 cal B.P., the social landscape changes again, reflecting the beginnings of the Koniag tradition, divided into the Early (650–450 cal B.P.) and Developed (450 cal B.P. to contact) phases. At this time, the size, frequency, and variety of sites increase (Fitzhugh 2003:179), indicating a growing population organized around a complex pattern of logistical foraging. Archaeological data begin to show a dichotomy in the construction of dwellings between settlement types, with one or two smaller, simply built structures in settings interpreted as loci of seasonal foraging and larger, more robust structures in settlements thought to represent long-term villages. In the Olga Lakes area, small and medium-sized settlements have much smaller mean house areas than large settlements, as well as fewer side rooms. By 450 cal B.P., massive multiroomed, sod-house villages appear in the archaeological record. Surveys from both coastal and riverine settings show that the number of medium and large settlements increases (Fitzhugh 2003:176), reflecting the development of truly large aggregation sites.

The use of environments also expands. There is more intensive use of the outer coast, particularly along Kodiak's southeastern shore, a pattern that reflects a growing emphasis on whaling (Fitzhugh 2003:195). Similarly, the banks of major salmon streams are heavily occupied, with large villages located many kilometers from the coast (Steffian et al. 2015:49–50). Settlements bearing distinctive Koniag-style houses and objects also begin appearing on the northern Alaska Peninsula indicating that that Gulf coast people moved west. These sites typically occur along the banks of sizeable salmon streams (Dumond 2005:44).

Based on the seasonal availability of resources, site contents, and surface features, we hypothesize that some very large interior villages were actually occupied throughout fall and winter. A final step in intensifying salmon use may have been the development of permanent, multiseason residences along interior salmon streams.

House construction techniques also change in the Koniag. Larger, more variable dwellings with side rooms characterize the tradition. This increase in size and the use of multiple side rooms as sleeping chambers—connected by sunken tunnels to main rooms—suggest that these are the first true multiroomed, multifamily houses. Interestingly, these larger houses consistently lack a sod roof over their central room. Structures appear to have reached a breadth too large to be safely or effectively covered

with a heavy layer of earth. Side rooms, however, continue to be sod-capped. The use of new, larger types of woodworking tools—large planning adzes in the Early Koniag and additionally splitting adze and mauls in the Developed Koniag—indicates the need for substantial tools to create substantial structures (Knecht 1995:732).

Like transitional dwellings, Koniag multiroomed structures contain a variety of features (Figure 12.3). The Early Koniag structures at the Settlement Point site had enormous meat-roasting pits, clay-lined pits, and a variety of hearths filling their central rooms (Saltonstall and Steffian 2005:92), suggesting a continued focus on the accumulation of stores, and perhaps the development of ethnographically known feasting. At Karluk One, large, wooden storage boxes built directly into house floors were a common main room feature, and at least one side room was used entirely for fish storage (Steffian et al. 2015:215). People of the Developed Koniag tradition also began to construct large gravel-tempered pots, presumably to hold oil rendered from sea-mammal fat (Knecht 1995:375). Together, these activities suggested a continued emphasis on the accumulation and control of surplus, the currency of a status-based economy. Artifacts related to warfare are another consistent find in the Developed Koniag, suggesting that raiding, another means of accumulation, was common (Knecht 1995:735–738).

Detailed analysis of faunal remains from household features, and comparison with Late Kachemak faunal assemblages, illustrate an increased reliance on salmon accompanies the Early Koniag phase (Partlow 2000:222). This increase is also suggested by the development of new fishing technologies. In the Koniag, people employed salmon harpoons in conjunction with fish weirs (Steffian et al. 2015:175–176), increasing their ability to harvest huge quantities of fish. The location of large inland villages suggests that residents were harvesting the full range of available salmon species, including pink salmon.

Why did fish production increase, households expand, and communities grow? Fitzhugh (2003:233–234) suggests that competition for a limited number of predictable resource patches among a growing late prehistoric population and a cooling Neoglacial climate were central factors. He suggests that increases in subsistence risk among a territorial population led to enhanced resource control, leadership consolidation, and the emergence of an elite class.

Whatever mechanisms led to social stratification, its archaeological signatures are marked. Koniag artifact assemblages show increases in both social differentiation and the ceremonial behavior that perpetuates social distinctions. The appearance of incised pebbles—finely etched with anthropomorphic designs (Donta 1992)—is one of the first indicators of this change. Temporally affiliated with the Early Koniag, these pebbles show stylized people wearing a variety of clothing. Some include depictions of ceremonial gear. The pebbles are thought to be amulets, gaming pieces, or perhaps both. Whatever their function, they provide rare documentary evidence of ceremonial practices, and link the Early Koniag with the spiritual culture of later centuries. By the Early Koniag, the people of Kodiak were participating in ethnographically documented ritual practices and had elaborate forms of dress and personal adornment.

Other evidence of ritual practices appears in the exceptionally well-preserved assemblage from Karluk One village. From this site, archaeologists recovered a wealth of mask parts, dolls, drum parts, rattle parts, feasting bowls, and gaming pieces, objects

Settlement Point Site AFG-015

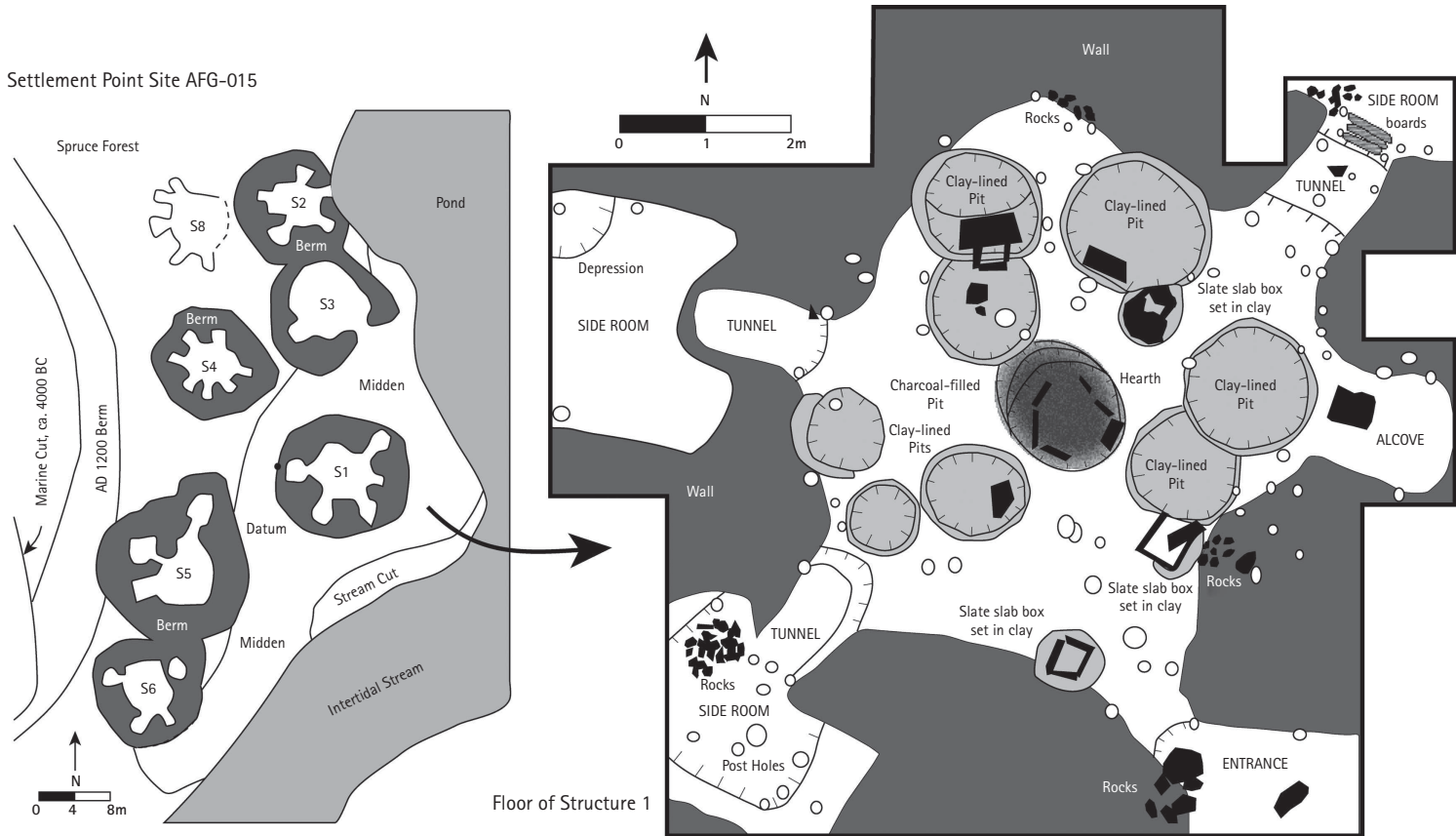


FIGURE 12.3 Early Koniag multiroomed house from Settlement Point (AFG-015), Afognak Bay.

Drawing by Amy Steffian and Patrick Saltonstall

ethnographically associated with festivals that helped the elite ratify their social positions (Steffian et al. 2015:311–323). Although masks and portable pieces of artwork are present in Late Kachemak assemblages, the volume of this material increases in the Koniag tradition.

Recent surveys also illustrate the presence of possible ceremonial structures. Many larger sites have extremely large, uniquely located structures with just one or two rooms. These may be *qasgit*—ethnographically known men’s houses constructed and managed by elite families. In such structures, Alutiiq people gathered for winter festivals led by the wealthy.

Evidence of social stratification appears in several categories of data, including village layout and house size. In earlier traditions, house sizes are relatively similar and settlements appear as informal clusters of structures. In the Koniag tradition, settlements have linear arrangements of structures, and some of these structures are much larger than others. Within communities, there is marked variability in the size of central rooms and the number and configuration of side rooms (Fitzhugh 2003:205–206). Moreover, larger dwellings tend to occur in groups in the center of settlements or at one end, suggesting the presence of elite neighborhoods.

Other indications of social differentiation appear in personal adornment. Labrets continue to be popular, but occur in a wider range of sizes and with a new decorative diversity, indicating an increased emphasis on individual status and display (Steffian and Saltonstall 2001:19).

Finally, evidence of long-distance trade suggests the presence of powerful leaders. While most nonlocal materials from Late Kachemak sites can be traced to sources adjacent to the Kodiak Archipelago (Steffian 1992a), a number of those from Koniag assemblages come from great distances—e.g., abalone and dentalium shells from the Northwest Coast, limestone from the Aleutian Islands (Knecht 1995:570). The ability to obtain materials from remote sources illustrates the reach of local leaders and the increasing integration of the Gulf of Alaska population.

The Koniag tradition ends in the late eighteenth century, with the conquest of Kodiak by Russian traders. Sustained interaction with Westerners began in 1763 with the development of the sea otter pelt trade. Archaeologically, this period is most notably marked by the presence of trade goods in sites and the consolidation of Alutiiq villages into regional centers. These material changes, however, are a poor indication of the enormous cultural change that took place. The spread of Western disease caused a massive population decline. Clark (1974:7) estimates that the Alutiiq population of Kodiak fell from roughly 9,000 individuals at contact to less than 3,000 by the mid-nineteenth century. This dramatic loss of life was accompanied by the suppression of traditional cultural practices due to the development of a cash economy, and the introduction of Russian language, religion, and social customs.

PRINCE WILLIAM SOUND PREHISTORY

While its modern coastline has been surveyed extensively, few excavations have taken place in Prince William Sound. The region’s prehistoric cultural chronology is known

mainly from two sites: Palugvik, in the southeastern part of the sound, with excavations in 1933 and 1996; and Uqciuvit, in the northwestern part of the sound, tested in 1988.

Nothing was known about the prehistory of Prince William Sound prior to about 2,300 years ago until excavations at Uqciuvit yielded a small amount of evidence of earlier occupation, beginning close to 5,000 years ago (Yarborough and Yarborough 1996). Today, a handful of sites with components dating between 4,000 and 5,000 years old and about 2,500 years old have been identified on several islands and the northwest mainland. During the Uqciuvit phase, the sound's environment was very different from today, with vegetation consisting mostly of shrub alder and moist sedge tundra, and no closed spruce or hemlock forest (Heusser et al. 1985). While the geomorphology of the north Pacific coast is complex and incompletely understood, the sea level stand during the Uqciuvit phase may have been higher than today, as the currently known components of this age are at elevations of 5 meters or more above modern sea level (Chaney 1997).

The people of this early phase hunted sea mammals and collected shellfish, and used red ocher, as well as both ground slate and chipped stone tools. These traits suggest that early Uqciuvit phase people could be related to Ocean Bay II people elsewhere in the Central Gulf, although the data are not currently sufficient to make broader comparisons (Yarborough and Yarborough 1996: 27).

The transition from the Uqciuvit phase to the subsequent Palugvik phase may coincide with the first Neoglacial event, during the fourth millennium B.P. A gap in the occupational sequence at Uqciuvit corresponds almost exactly with the time period—about 3200–2500 B.P.—of the advance and retreat of tidewater glaciers in northwestern Prince William Sound (Yarborough and Yarborough 1998:138). During this time, glacial ice advanced to within about 7 km of the site, and may have driven its inhabitants from the inner coast of the sound (Heusser 1983:351; Workman 1980:58). Such movement to less-glaciated areas appears to be supported by radiocarbon dates from two sites in the northwest part of the sound. A charcoal sample (Beta-89058) from a stratified deposit at SEW-488 on Knight Island yielded a conventional date of 2680 ± 60 B.P., or 2925–2719 cal B.P. (this and following calibrated dates were obtained using Calib 6.0, with the calibration data set IntCal09.14c). A charcoal sample with a conventional date of 2740 ± 60 B.P. (WG-2371), or cal 2879–2769 B.P. was recovered during excavations at SEW-430, a site on Eleanor Island (Figure 12.4). However, the paucity of data from these sites raises more questions about cultural adaptations than it answers. As the tidewater glaciers of the first Neoglacial event receded, the Sitka spruce or hemlock forest began colonizing the sound. By 2000 B.P., this northernmost portion of the Northwest Coast rainforest likely appeared much as it does today (Heusser 1983:343–345).

Uqciuvit was reoccupied about 2400 B.P. and Palugvik was settled about 2250 B.P. Over the next several thousand years, prehistoric cultural change, as measured artifactually, was very gradual, and is interpreted as *in situ* cultural development. Such change appears in small increases and decreases in the prevalence of artifact types. The number of types that are actually abandoned or newly added over time are rather limited, suggesting a large degree of economic stability. Palugvik-phase technology, characterized at the well-preserved Palugvik site, includes a large proportion (70 percent) of bone artifacts, especially sea-mammal bone—awls, needles, drill rests, blades, scrapers, daggers



FIGURE 12.4 SEW-430, Rock Shelter site.

Photograph by Linda Finn Yarborough, June 1993

or picks, handles, tubes, labrets, buckles or toggles, fish vertebrae rings or disks, pins, fish spear barbs and compound fishhook parts, detachable barbed harpoon heads, harpoon foreshafts and socket pieces, arrowheads, barbed points, and bone shafts. Ground-slate artifacts include ulus, double-edged blades, and a long thin type of projectile point likened in shape to an “awl.” Manufacturing tools made of slate and other types of ground stone include drill bits, chisels, planning adzes, stone saws, whetstones, and hammerstones. Red ochre associated with several artifacts suggests its use as paint.

A subtle technological change occurred about 1,500 years ago, concurrent with a cooler climatic period, and marks the transition between early and late Palugvik-phase technology. Early Palugvik-phase artifacts that have not been found in late Palugvik-phase strata include incised slate plaques, bone drill rests, tanged points, elongated stone scrapers, flaked ulus and ulu-shaped scrapers, and bar whetstones. Splitting adzes are known from the late, but not the early, Palugvik phase, and suggest advancements in woodworking technology. Fire-cracked rock is rare in early Palugvik strata, but more common by the end of late Palugvik phase (Yarborough 2000:250–252; Yarborough and Yarborough 1996:25–26, 29). However, the presence of Sitka spruce or hemlock forest by 2000 B.P., numerous woodworking tools recovered from excavations, and generally acidic forest soils suggest that many artifacts of perishable materials were not preserved.

The 1933 excavations at Palugvik provide the only evidence to date of Palugvik-phase houses. Two large wooden posts, 20–27 cm in diameter, were found approximately 2 m apart in the lowest strata of the excavation. Two smaller posts, also about 2 m apart,

were located about 8 m to the southwest. One of the large posts had small pointed stakes driven into the soil around it; both large posts were associated with large stone slabs, possible post supports. A rectangular stone hearth appeared to be associated with the northernmost posts. The structures do not appear to have been semisubterranean (De Laguna 1956:40–44, 249–251). A late Palugvik semisubterranean house, about 1 m deep, at least 3 m wide, and about 5.5 m long, had a stone fireplace, a mud or clay floor, and four post holes along one wall (De Laguna 1956:46–48). A pit hearth, similar to coeval examples from Cook Inlet's Yukon Island, was also found in late Palugvik-phase context.

Salmon (*Salmonidae* sp.) and Cod (*Gadidae* sp.) family fish were subsistence staples for Palugvik phase inhabitants of the sound. Pacific cod, and to a lesser extent, small flatfish, rockfish and sculpin, herring, and skate, may have been particularly important during seasons when salmon were not running (Yarborough 2000:142–145, 259). The faunal collections from Palugvik and Uqciuvit suggest an increased focus on fishing, particularly of salmon, during the late Palugvik phase.

Pinnipeds, sea otter, porpoise, and large whale were also important during the early Palugvik phase. Although it has been assumed that the cetacea remains represent baleen whales, the only species identified through DNA analysis was sperm whale; orca is represented by a tooth. Land mammals and birds in the collections represent a much smaller portion of the species recovered (Yarborough 2000:137–149).

Uqciuvit and Palugvik are large village sites adjacent to salmon streams. However, intermittently occupied sites like SEW-440 and SEW-430 suggest that Palugvik-phase people moved seasonally from one location to another, possibly to be closer to particular resources (Yarborough 1997:54). The apparent increasing reliance on salmon and shellfish in late Palugvik-phase strata, preceding abandonment of Palugvik, may relate to changes in site seasonality.

The Palugvik phase is related to the Late Kachemak tradition, with pervasive similarities in stylistic details and general cultural trends. Prince William Sound appears to have been along the northeastern edge of the Kachemak cultural continuum that is best known from sites on Kodiak Island and the shores of lower Cook Inlet. Close ties between Palugvik and Kachemak phase sites are evident in styles of slate points, fish-hooks, labrets, stone lamps, flaked stone tools, and bone wedges. Differences in burial practices may indicate some regional social distinctions. No modification of human bones is known from Palugvik-phase burials, and there is no evidence of crypts with multiple interments, although in one instance two individuals appear to have been buried together. At least one Palugvik-phase resting place was constructed as a coffin-like plank-lined hole (De Laguna 1956:67–70). The Palugvik phase continues another 500 to 700 years beyond the A.D. 500 temporal boundary believed to mark the disappearance of the Kachemak tradition from Kachemak Bay (Yarborough and Yarborough 1998:138).

The transition from Palugvik to Chugach phase appears to occur between about A.D. 1200 and A.D. 1400, and coincides generally with the onset of the third Neoglacial event, or Little Ice Age. The Palugvik site appears to have been abandoned during this transition period, however Uqciuvit, SEW-430, SEW-440 and SEW-488 continued to be occupied (Yarborough 2000:127–131). The Chugach phase continued into the early

historic period. Artfactually it is marked by an abundance of steambath generated fire-cracked rock, the introduction of slate endblades, quartz crystal gravers, and copper bipoints; and the absence of the slate “awl” projectiles common to the Palugvik phase (Yarborough and Yarborough 1996:27–28). However, the evidence indicates that the people of the Chugach phase were most likely direct descendants of Palugvik-phase people (Yarborough and Yarborough 1998:138, 140).

Artifacts of exotic materials indicate trade with other regions. Caribou skins and meat were obtained most likely from Cook Inlet or the Copper River. Copper for cold-hammered artifacts appears to have been obtained through trade from the Copper River area, and dentalium shells from British Columbia (Yarborough and Yarborough 1996:A-21). Early historic records and later ethnographic evidence document regular trade, by the end of the Chugach phase, with several Athapaskan groups—the Eyak, the Ahtna, and the Denaina (Birket-Smith 1953:100–101).

Faunal collections from Uqciuivit, SEW-440, and Palugvik show an increase, during the Chugach phase, in the use of both salmon and a variety of other fish such as Pacific cod, halibut, rockfish, sculpin, and herring (Yarborough 2000:231–232). While marine mammals appear to also have been important, and terrestrial mammals and birds were procured, the increased amount of fish suggests a possible change in subsistence strategy.

Several types of structures were used during the Chugach phase. At Uqciuivit these include a semisubterranean house with a wide sloping “bench” surrounding a deeper area with a roof supported by Sitka spruce posts, and structures of unknown purpose represented by gravel, and woodchip-lined “floors,” of gravel, wood chips, organic matter, or planks, and by a rock wall, wood-lined pits, and possible steambaths (Yarborough and Yarborough 1996:20–21). A late Chugach-phase semisubterranean house described by Steller on Kayak Island was 6.1 m long, 4.3 m wide, and 4.3 m deep, with a roof of bark weighted down with stones and grass, and supported by poles. A smaller nearby house made of wide boards had a plank floor and corner fireplace (De Laguna 1956:59). Both plank winter dwellings and more temporary huts built of poles and bark were described and illustrated in the 1790s (Birket-Smith 1953:53).

Evidence of adornment occurs throughout the prehistoric record in the sound, including items such as a heavily beaded apron, shell beads and pendants, slate and ivory labrets, and an elaborate hair ornament. Their extent and context suggest that the social stratifications recorded during the early historic period may have existed prehistorically.

An increase in territoriality and violence in Sugpiaq society during the Chugach phase may be seen in the development and use of “defensive” sites on small islands with steep bluffs or difficult landing places. At European contact, warfare between tribes within the sound, as well as with more distant groups, was not uncommon (Birket-Smith 1953:101–103).

Rock art exists as undated red hematite pictographs on rock shelter walls in several places in the sound. Paintings depict people, faces, boats, animals, and geometric shapes (De Laguna 1956:102–107). Associated or nearby sites include both Palugvik- and Chugach-phase strata.

The early historic Chugach and Kodiak Sugpiaq peoples are recognized as both culturally and linguistically related. Prehistorically, the artifactual remains from Kodiak, Cook Inlet, and Prince William Sound suggest that the cultural continuum in evidence during the previous Palugvik phase and Late Kachemak period remained much the same in ensuing years through both diffusion and common ancestry (Yarborough and Yarborough 1998:141).

There is also a strong relationship between the prehistoric people of Prince William Sound during at least the Chugach phase and inhabitants of areas to the east (De Laguna et al. 1964:209). Some artifacts, such as double-pointed war picks and stone pestles, are found no further north than the sound, and the Chugach were the only Sugpiaq group to use wooden dugout canoes (Workman 1980:80).

The Chugach phase ended in the late eighteenth century as fur traders arrived from European countries. Georg Wilhelm Steller and Lt. Khitrov of Vitus Bering's crew landed with a few other men on Kayak Island in 1741, but only indirectly traded with the inhabitants (Golder 1922:99). Captain James Cook made the first direct contact in 1778. The first Russian trading expedition to the sound occurred in 1783, and was the precursor to subsequent contacts, which culminated in the establishment of a Russian American Company settlement in 1793 near Nuchek. The end of the Chugach phase occurred when the Sugpiaq of Prince William Sound entered the Western economic sphere through trade for Western clothing and ornaments, firearms, foods, dry goods and sundries, and eventually cash, as seen archaeologically through the presence of trade goods. It is also marked by social changes that included a drastic reduction in population due to introduced diseases, conversion to Orthodox Christianity, and introduction of Russian social customs and language.

SUMMARY

The broadly cohesive Alutiiq/Sugpiaq communities encountered by Europeans during the eighteenth century were part of a cultural core that had developed over millennia. Although the Central Gulf's regions have obvious geographic distinctions, they share a commonality of coastlines, environments, climate, and resources. Archaeological data indicate that the waters between these regions were a link not a barrier for the skilled mariners who inhabited this area.

The apparent core of the area is the Kodiak Archipelago, where many sites of Kachemak- and Koniag-tradition cultures have been tested and analyzed. Yet, similar traditions are known from southern Cook Inlet, Prince William Sound, and the Alaska Peninsula, where research continues to reveal a shared evolutionary path of economic intensification, settlement permanence, and more complex forms of social organization. Together, data from the region illustrate a unified history, one where mainland societies enhanced the core of ancestral Alutiiq/Sugpiaq culture. Peoples of the Central Gulf interacted with neighbors and brought resources and ideas, both symbolic and technological, to the region.

NOTES

1. At European contact, Athapaskans lived along the upper inlet coasts. However, this area was possibly inhabited by Alutiiq ancestors.
2. Sugpiaq is the traditional ethnonym for the people of the Central Gulf. In the eighteenth century, Russian traders introduced the term Aleut, pronounced Alutiiq in the Sugpiaq language.

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CHAPTER 13

ARCHAEOLOGY OF THE EASTERN ALEUT REGION

HERBERT D. G. MASCHNER

ALLEN MCCARTNEY (McCartney 1984) presented an Aleutian chronology that has been supported by the last 30 years of research in the region. While considerable variation has been documented across the mainland and islands, and with the recognition that local variation often overshadows macroregional similarities, McCartney's chronology, at least in terminology if not actual dates, will be used in this presentation. He recognized the Anangula tradition, dating from approximately 9500–8000 B.P.,¹ he argued for a gap in the sequence until a number of early sites appeared in the eastern Aleutian Islands about 7000 B.P., arguing that the Aleutian tradition was in full swing by 4400 B.P. McCartney argued that the tradition, with a number of regional and local subphases, could be seen directly as the ancestry of the Aleut peoples, and a period of continuous social, political, and economic development across the entire region. But following a discussion at the 2001 Arctic Conference, and continuing with research being conducted by McCartney and this author at the time of his death, McCartney and Maschner had created the concept of an Incipient Aleutian tradition from 7000 to 4400 B.P. and had defined an Early, Middle, and Late Aleutian tradition (Maschner 2004a). These terms, first created by McCartney, will be used in this review.

The Aleut (Unangan) occupied the Aleutian Islands, the Alaska Peninsula eastward to a line running from just east of Bear River south to Ivanof Bay, and the islands south of the Alaska Peninsula (Lantis 1970; McCartney 1984; Townsend 1983) (Figure 13.1).² East of this area was historically occupied by the Alutiiq (Clark 1984, 1990), but as I have argued elsewhere (Maschner et al. 2009b), there is considerable evidence that the Alutiiq were late arrivals in the region, and prior to A.D. 1200, Kodiak and adjacent regions were occupied by the Aleut as well, only in the form of the Ocean Bay and Kachemak traditions (Maschner 2012).

The western Alaska Peninsula and eastern Aleutian Islands are often seen harboring some of the richest marinescapes in the Pacific region and this resulted in the largest human populations, the largest villages, and the most socially complex organizations

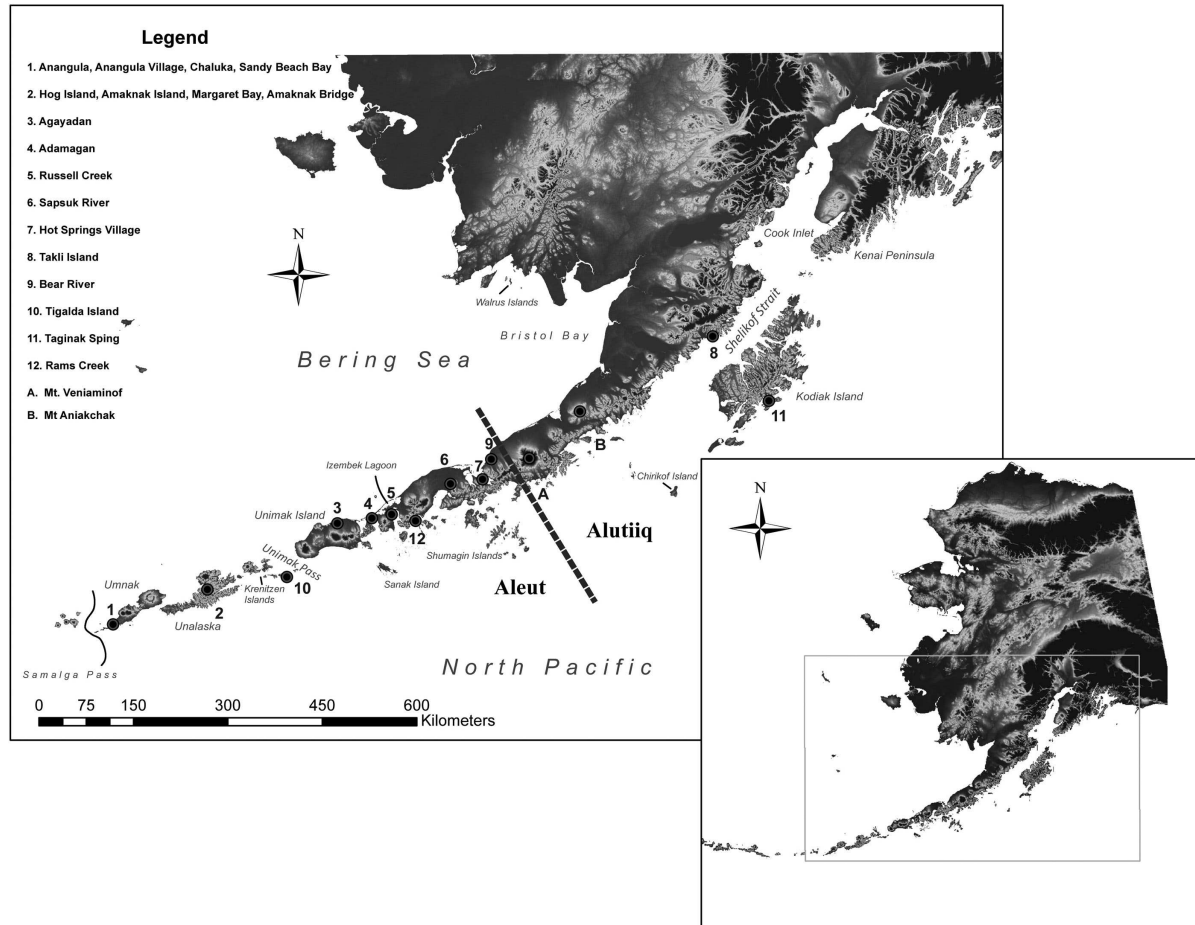


FIGURE 13.1 Map of southwest Alaska showing sites discussed in the text. (1) Anangula, Anangula Village, Chaluka, Sandy Beach Bay; (2) Hog Island, Amaknak Island, Margaret Bay, Amaknak Bridge; (3) Agayadan; (4) Adamagan; (5) Russell Creek; (6) Sapsuk River; (7) Hot Springs Village; (8) Takli Island; (9) Bear River; (10) Tigalda Island; (11) Taginak Spring; (12) Rams Creek; (A) Mt. Veniaminof; (B) Mt. Aniakhchak.

Map by Jeff Zausch and Herbert Maschner

in the Eskimo-Aleut world (Maschner and Hoffman 2003). But these rich waters were not without variation, and recent research has shown important temporal and spatial variation in primary productivity that affected regional populations (Misarti et al. 2009; Misarti and Maschner 2015; Trites et al. 2007). Therefore, the archaeological data will be juxtaposed against these changes and variations in the marine ecosystem.

This chapter will focus on four broad categories of the archaeological record: villages and houses, social complexity and changes in status and identity, subsistence change, and technological change. One of the interesting highlights of this discussion is that the eastern Aleutian Islands and the Alaska Peninsula region will be shown to be inversely affected by changes in the marine ecosystem, and the result is alternating chronologies: when the west is expanding or becoming more complex, the eastern areas are contracting or disintegrating, and vice versa. Rare are the centuries where the two regions are synchronized in the archaeological record.

These four categories of data will be juxtaposed against the two principle criteria in the evolution of north Pacific societies. First is the relationship between marine productivity and both human and nonhuman populations. Previous research has shown conclusively that cooler sea-surface temperatures lead to greater marine productivity and thus larger populations of sea mammals and fish.

Second, the relationship between access to certain types of sea mammals, the resulting technology, and implications for boat construction are equally critical (Maschner et al. 2014). Sea lions are the primary source of boat covers. It takes 5–7 Steller sea lion skins to cover a kayak, more than 20 for an umiak type of open boat. Given the labor requirements in removing hair from a fur seal skin, they are an impossible alternative. While the labor in removing hair from a harbor or ring seal is somewhat less, it would take 12–15 harbor seal skins to cover a kayak, and nearly 50 to cover a large open boat. Unlike the kayaks of the eastern Arctic, with ring or harp seal skins that could last several years because of the flat waters and seasonal use, the boat coverings of the Aleutian Islands would have to be replaced every year. A village of 75 people with 15–20 adult males might use 80–100 sea lion skins per year for their boats, but if reliant on harbor seals, 200–300 might be needed, plus the labor to remove the hair from them. Because of the number of stitch lines, these boats would have been much less durable and less adept at rough-water use. This simple recognition provides some of the missing elements in understanding the complex history of the western Gulf of Alaska.

THE ANANGULA TRADITION

The Anangula tradition is a simple construct. It represents peoples who found themselves stranded on a series of islands after sea levels rose at the end of the last glacial after 10,000 years ago. The earliest site of this tradition, Anangula, is found on a small island off the north coast of Umnak Island. It is a late Pleistocene prismatic blade-based technology situated in a Holocene marine system. These blades were most likely insets

in bone or ivory shafts, but many are large enough to be endblades. It is an early village with a number of small, oval houses 6–8 m², often with the hearth near one wall (Aigner 1978; Aigner and Del Bene 1982; Laughlin 1984). Why a village? As Maschner has shown before, many of the important aspects of forager mobility, such as taking advantage of spatially and temporally disjunct resources, would not have been present because this is a redundant landscape: the same resources in the same locations regardless of where one might locate (Maschner 1999b).

This village can have resulted from only one element: there must have been a large, resident population of sea mammals present on the island, or in the near-shore areas, which had no fear of humans. Large thrusting spears with blade insets were used to harvest them. These were probably Steller sea cows and sea lions. When these populations were extirpated, the people moved on to other nearby islands. There are a number of small, ephemeral sites in the Unalaska area (Davis and Knecht 2010; Dumond and Knecht 2001; Knecht and Davis 2001; Rogers et al. 2009), but mostly on small islands in the larger harbor where sea lions might have had rookeries or haul-outs.

The critical aspect of the Anangula tradition is that it did not spread to other areas where there should have been large colonies of sea mammals. These peoples did not cross Samalga Pass west of Umnak Island, and they did not cross Unimak Pass east of the Krenitzen Islands. This can only mean one thing: they could not safely cross large bodies of rough seas. Their boating technology must have been very primitive, probably limited to a few small open boats. Based on data from more recent millennia, when the marinescapes of the middle Holocene became much warmer, reducing primary productivity, the already heavily harvested resident populations of sea mammals either moved offshore, or were so reduced in numbers that they could not sustain the people there. There is also considerable evidence of catastrophic volcanic activity at this time (Mason 2001). By 8,000 years ago, the Anangula people were either gone, or so few that their footprint is negligible.

Davis and Knecht (Davis and Knecht 2010; Knecht and Davis 2001) have concluded, based on a few bridging radiocarbon determinations (Rogers et al. 2009) and the presence of blades and microblades, that there is continuity between the Anangula tradition and later traditions in the eastern Aleutian Islands, a conclusion also drawn by Dumond (Dumond 2001). But five radiocarbon dates spanning over 1,000 years on a single stratigraphic layer is little evidence for continuity. Furthermore, if we agree with the hypothesis that there was a post-7000 B.P. expansion out of Kodiak Island of Early Ocean Bay peoples, as will be discussed in the next section, an argument for continuity is not necessary, and in fact, becomes very weak.

INCIPIENT ALEUTIAN TRADITION

In his 1984 review of Aleut archaeology, McCartney defined the Anangula tradition, highlighted a gap in the sequence, noted the lower part of Anangula Village on Anangula

Island, and then started the Aleutian tradition. By the time of his death, McCartney had recognized that there was evidence for an Incipient Aleutian tradition that predated the Aleutian tradition. Dating after 7,000 years ago, and ending somewhere around 4,200–4,400 years ago, this tradition is a suite of related archaeological complexes that appear to have a fairly common origin. With the then recent discoveries at Margaret Bay (Knecht and Davis 2001), he now agreed that Dumond was largely correct in his assertion that the early Ocean Bay tradition of Kodiak Island may have been the source of these early islanders (Dumond 1970, 1987a, 1987b, 2008; Dumond and Bland 1995), and together with Sandy Beach Bay (Aigner et al. 1976; Mason and Aigner 1987), the largely unpublished Anangula Village collections from the Umnak Island area (Laughlin 1980), and the Takli Alder phase of the upper Alaska Peninsula (Dumond 1981), an Incipient Aleutian tradition could be defined.

In the last 10 years, this has become an even stronger view. With the recent finds of archaeological sites dating between 6,500 and 5,000 years ago on the Walrus Islands in Bristol Bay (Schaaf et al. 2007), along the Sapsuk River on the Alaska Peninsula (Maschner et al. 2010), on Sanak Island (Reedy-Maschner and Maschner 2012), and further finds on Unalaska Island at the Margaret Bay site (Davis 2001; Davis and Knecht 2010; Knecht and Davis 2001), all based on some sort of bifacial technology with large, stemmed and lanceolate endblades (Figure 13.2) and often with blades and microblades, there appears to have been a regional expansion of peoples at this time. As Dumond has repeatedly argued, the only source for these peoples is Kodiak Island and the north shore of Shelikof Strait (Dumond 1987a, 2008). A perfect example is, of course, Fitzhugh's discoveries (Fitzhugh 2004) at the Tanginak Spring site. A recolonization of the region from Kodiak by peoples using both bifacial and blade technologies (Maschner et al. 2010) at the beginning of what Davis and Knecht term the Late Anangula (Davis and Knecht 2010) is more parsimonious with the data and the known prehistory than arguing for continuity with no sites, a scattering of dates, and no explanation for the development of bifacial technologies after 3,000 years of unifacially retouched blade assemblages.

Ocean Bay I is a fairly rapid development and is followed by Ocean Bay II in the Kodiak region, which is basically Ocean Bay I but most of the technology is polished slate (Clark 1984). Both of these technological complexes are dominated by large endblades that certainly had one primary function: the spearing of beach-based large sea mammals, probably sea lions but perhaps harbor seals as well. We should expect that in the transition from the large projectiles of Ocean Bay to the small projectiles of the Kachemak tradition around 3,500 years ago (Clark 1984, 1994, 1996) there would be a significant reduction in the number of large sea mammals in faunal assemblages, and this is indeed the case (Kopperl 2003).

Most archaeologists (other than Dumond and Maschner) do not see the direct connections across the north Pacific and Bering Sea at this time, interpretations blinded most often by the polished slate of Kodiak and the microblades of the eastern Aleutian Islands. But the recent finds between these two zones, especially on Sanak Island and the Alaska Peninsula, show clear clines in frequency distributions. Polished slate decreases with distance west from Kodiak, primarily because that is the only source of the raw

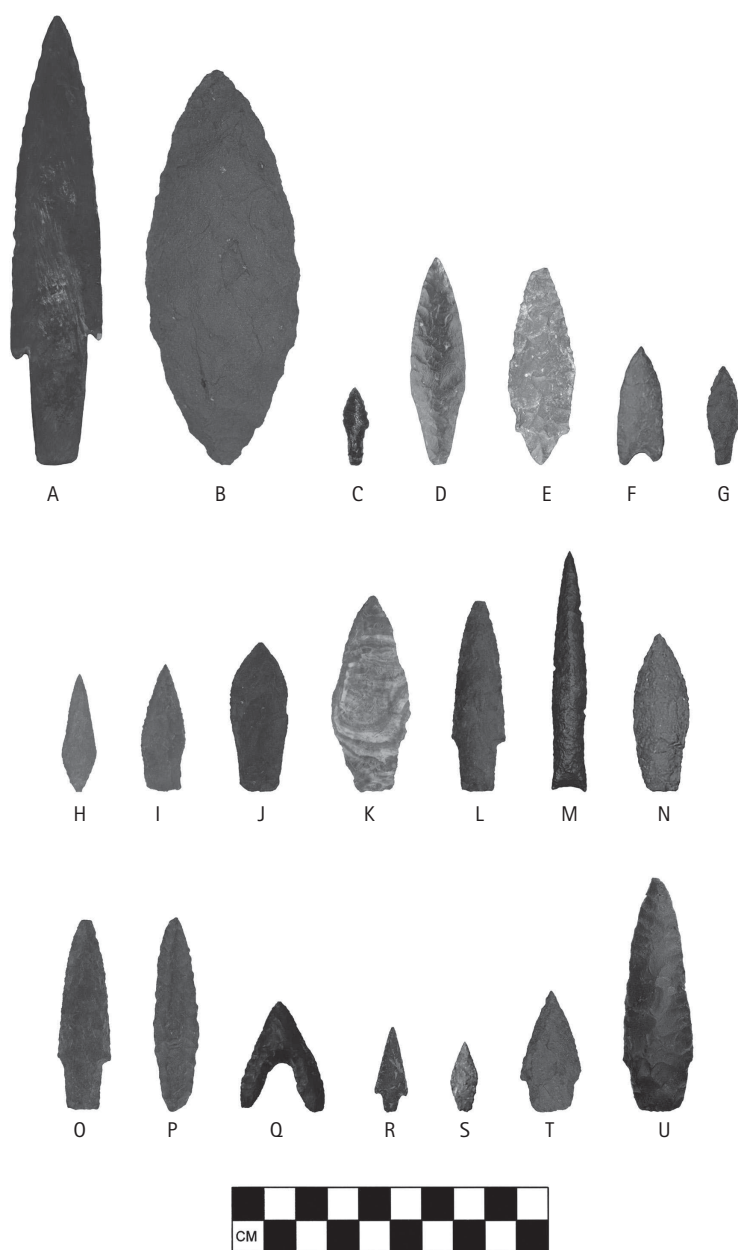


FIGURE 13.2 Endblade chonology for the western Gulf of Alaska and Southern Bering Sea. (a) Ocean Bay II polished slate endblade, Sitkalidak Island, Kodiak Archipelago, 5000 B.P.; (b) bifacial endblade, Sapsuk River, 4400 B.P.; (c) Arctic Small Tool tradition endblade, Sapsuk River, 4400 B.P.; (d) Sanak Point, Sandy Dunes, Sanak Island, 4200 B.P.; (e) Ocean Bay-style endblade, Sandy Bay Bluff site 2, Sanak Island, 4000–3830 B.P.; (f) Arctic Small Tool tradition endblade, Sapsuk River, 3800 B.P.; (g) Russell Creek point (similar to ASTt Denbigh endblades from Iyatayet), Russell Creek, Cold Bay, 3600 B.P.; (h, i) endblades, Hot Springs Village, 3300–2900 B.P.; (j) endblade, early Adamagan, 2600 B.P.; (k) contracting stem endblade, early Adamagan, 2600 B.P.; (l) rhomboid endblade, Adamagan, 2400–2000 B.P.; (m) fishtail projectile, Sanak Island, 2400–1900 B.P.; (n) parallel leaf point, Hot Springs Village, 1500 B.P.; (o) stemmed endblade, Hot Springs Village, 1500 B.P.; (p) contracting tail, Hot Springs Village, 1500 B.P.; (q) Ram's Creek arrow point, Ram's Creek, King Cove area, 1800 B.P.; (r) Star Trek communicator endblade, Hot Springs Village, 1500–1200 B.P.; (s) Hot Springs Type 2 arrow point, Hot Springs Village, 1400 B.P.; (t) small Izembek point, XCB-003, 700–500 B.P.; (u) large Izembek point, XCB-003, 700–500 B.P.

Image compiled by Buck Benson and Herbert Maschner

materials. Microblades decrease with distance east from Unalaska (and probably west as well), although why microblades were still being used in that area is poorly investigated, other than an assumption of normative connections with the earlier Anangula tradition, an assumption that is untenable given the current data.

It is clear from these data that sites such as Mink Island and Takli Island on the Alaska Peninsula, and Rice Ridge on Kodiak Island (Kopperl 2012), were early versions of this phenomenon that rapidly spread across the region. This expansion occurs during a hemispheric-wide cool period (Magny and Haas 2004; Mason and Bigelow 2008) that likely increased regional productivity, thereby increasing the numbers of sea mammals. But there also must have been advancements in boating technology because these peoples arrived on islands that previously were uninhabited and most likely inaccessible with previous boats. What is truly fascinating is that we can also conjecture that the boats were better, but not great, because once they arrived on these distant islands, they did not interact much with other areas, with each island beginning a slightly variant cultural sequence. While much has been said about the distribution of Okmok obsidian from Umnak Island both westward into the Aleutians (Hatfield 2010; Nicholaysen et al. 2012) and eastward to the Alaska Peninsula (Maschner et al. 2010), the total weight of the known obsidian from these distant areas is less than a kilogram—hardly volume indicative of an active trade network or evidence for inter-island interactions..

They used a distinctive harpoon, a fixed variety with bilateral barbs and a T-shaped base (Figure 13.3) for the line (Maschner 2008). The earliest known examples are found on the east coast of Siberia about 7,000 years ago (Popov and Yesner 2006; Vasil'evskii 1998), and their widespread distribution in contexts that have sufficient preservation along the North Pacific implies a long history of use, perhaps descendent from the original colonizers. This also implies that they did indeed hunt sea mammals offshore when possible.

These were early villages with small, oval, single-family houses organized into small clusters. Many of these houses have slab-box hearths, the earliest examples in the northern hemisphere (Maschner and Jordan 2001; Reedy-Maschner and Maschner 2012). They were sea-mammal hunters of the shoreline and near-shore. They fished near-shore waters, hunted birds, and occasionally collected shellfish. They harvested salmon if they lived in the appropriate locations. The only real surprise of this scenario is that the early Ocean Bay tradition, from the Kenai Peninsula westward, through the Incipient Aleutian tradition of the western Gulf, and further westward to the central Aleutian Islands were all originally Aleut, with the Kodiak area as the source. More on this below.

EARLY ALEUTIAN TRADITION

McCartney saw the Early Aleutian tradition as the first clear representation of what would become the Aleut thousands of years later. This tradition begins about 4,400–4,000 years ago, but there is variation of ± 400 years, depending on location. Rather



FIGURE 13.3 Harpoon chronology for the western Gulf of Alaska and the southern Bering Sea. (a) T-shaped base harpoon, Sanak Island, 4500 B.P.; (b) T-shaped base harpoon, Hot Springs Village, 4000 B.P.; (c) gouged-hole harpoon, Sandy Dunes, Sanak Island, 3700 B.P.; (d) fixed-base harpoon, Hot Springs Village, 3200 B.P.; (e) fixed-base harpoon, Hot Springs Village, 3600 B.P.; (f) XFP-103, Sanak Island, 3800 B.P.; (g, h) early toggling harpoons, Hot Springs Village, 3000 B.P.; (i) XFP-061, Sanak Island, 2600 B.P.; (j) Hot Springs Village, 2300 B.C.; (k) toggling harpoon, XFP-061, Sanak Island, 2300 B.P.; (l) toggling harpoon, XFP-096, Sanak Island, 2300 B.P.; (m) toggling harpoon, Hot Springs Village, 1600 B.P.; (n, o, p) open-socket toggling harpoons, Hot Springs Village, 1500–1200 B.P.; (q) bilateral harpoon, Hot Springs Village, 1500–1200 B.P.; (r, s) off-center line hole, Hot Springs Village, post-1400 B.P.

Image compiled by Buck Benson and Herbert Maschner

than a transition from the Incipient Aleutian tradition, it is more of an expansion. The result is many more villages, each with many more houses. Most of these villages, such as the Chaluka midden at Nikolski (Aigner 1974; Laughlin 1980, 1984), Margaret Bay in Unalaska (Davis and Knecht 2010; Knecht and Davis 2001), Sandy Dunes on Sanak Island (Cordell 2009), Russell Creek in Cold Bay (Maschner and Jordan 2001), or the Hot Springs Village site in Port Moller (Kotani 1980; Maschner 2004b) on both the north side of the Alaska Peninsula and the Shumagin Islands of the south side (Johnson and Winslow 1992; Maschner 1999a; Wilmerding 2005), have characteristics in common. The first is that they are occupied for several centuries before a major expansion around 3700–3600 B.P., at which time they begin harvesting large quantities of shellfish. In all cases, projectiles and other stone endblades become much smaller and rarer, demonstrating a substantial decrease in the importance of large sea mammals (Figure 13.2). Harpoons change to a simple, single-barb variety with a unilateral shelf for attaching a line (Figure 13.3). There are plummet (line weights) across the region (a former-type artifact of the Kachemak tradition on Kodiak), and on the Alaska Peninsula, compound leisters for salmon harvesting.

Many would argue that the Neoglacial climate event begins in this region after 5,000 years ago (Mann et al. 1998; Mann and Hamilton 1995), but most of the effects appear after 4,000 years ago (Jordan and Krumhardt 2003; Jordan and Maschner 2000), contemporary with village expansion and the transition to greater shellfish use. But there is another event that has a substantial impact on this time period. The eruptions of Aniakchak and Veniaminov volcanos between 3400 and 3600 B.P. split the Aleut world (VanderHoek 2009) with the Early Aleutian tradition continuing to the west, and the beginnings of the Kachemak tradition in the east on Kodiak Island and the Kenai Peninsula region. This is also a period where there are small infiltrations of technologies related to the Arctic Small Tool tradition (ASTt) along the Alaska Peninsula and into the eastern Aleutian Islands (Knecht and Davis 2001; Maschner and Jordan 2001). The box hearths of the previous period continue across the region. The production of microblades is still common in the Unalaska area, and they are present but rare on the Alaska Peninsula.

Approximately 3,500 years ago, the sequences of the eastern Aleutian Islands and the western Alaska Peninsula diverge and look very different until historic contact. Not only are they different in terms of architecture, village structure, and technologies, but they also alternate periods of population expansion and contraction. For example, between 3,500 and 2,600 years ago, sites are very rare in the east. In the 350 km between the eastern Aleut boundary and Unimak Pass, there is only one shell midden dating in this period, the massive midden at Hot Springs in Port Moller, which is abandoned by 2900 B.P. The few other sites are small, ephemeral, and show little evidence of substantial occupation.

The converse is true for Unalaska. This exact time period sees the elaboration of Aleut society in every category of analysis. At Amaknak Bridge, multi-room stone houses are constructed of massive stone slabs with box hearths, stone chimney flues, and substantial walls (the only other multiroom houses at this time in the northern hemisphere are

the Old Whaling culture at Cape Krusenstern) (Darwent and Darwent this volume, chapter 15). There are finely polished line weights for offshore fishing, more styles of harpoons, and an elaboration of the chipped stone technology with many more specialized tools. There are burials with extensive preparation, and evidence of status differentiation and body ornamentation in the form of labrets, pins, and weaponry (Davis and Knecht 2010; Knecht and Davis 2005, 2008).

On the Alaska Peninsula and adjacent islands there is very little to compare with the Unalaska sites. But at Hot Springs there are several interesting developments at this time. The stone and bone technologies are similar to the regional trends of the early part of the Early Aleutian tradition, except for the addition of a strange toggling harpoon about 3,300 years ago (Figure 13.3). But in general, the assemblage looks more like Kachemak to the east (without slate) than it does the eastern Aleutian Islands to the west. A distinguishing characteristic is the presence of large oval houses, quite different from the stone houses of Amaknak Bridge, and different from the more square houses of the early Kachemak on Kodiak. Houses in both regions have internal and external storage pits.

But there is one broad area of similarity across the region under discussion. About 3,300 years ago a ceremonial or shamanic complex arises that appears to be large in scope (Maschner 2008). Two items of significance are introduced at this time. The first is small masks made of whale bone (Figure 13.4). They are too small to be worn on the face, and appear to have been worn hanging from the neck, perhaps against the chest like a later Norton period representation described in Maschner (2008), and much like the Ipiutak burials (Larsen and Rainey 1948; Mason 2009a, 2009b, 2014). The second item is a group of small ivory figurines that also appear to have been worn around the neck. These often have life-like faces with tattoos and labrets. These items are found in almost identical forms both at the Hot Springs Village site and at Amaknak Bridge and related sites 440 km to the west. Perhaps relevant is the fact that this same form of figurine is found at the Choris site in Bering Straits in the context of large, oval houses much like those found at Hot Springs. A strong argument can be made that the Choris culture is probably a product of people moving from the southern Bering Sea (Giddings 1967; Giddings and Anderson 1986; Maschner 2008).

Why Hot Springs was abandoned at 2900 B.P., and Amaknak Bridge at 2600 B.P., is unknown. These were the two largest communities of the Early Aleutian tradition in the region and represented the full elaboration of early eastern Aleut society.

MIDDLE ALEUTIAN TRADITION

Unlike the previous discussion, the Middle Aleutian tradition is poorly represented in the eastern Aleutian Islands, but is expansive on the Alaska Peninsula. It is first identified about 2600–2400 B.P. and ends around 1000 B.P., with the early part of this tradition best represented at Adamagan, the later part of the Middle Aleutian is extensive at Hot Springs. But it should be noted that between 2400 and 1900 B.P., and between 1500 and



FIGURE 13.4 Ritualistic art from the western Gulf of Alaska and southern Bering Sea. (a–k) Hot Springs Village, 3400–2900 B.P.; (l–m) Hot Springs Village, 1600–1200 B.P.

Image compiled by Nicholas Clement and Herbert Maschner

1100 B.P., there are sites everywhere, with surprisingly fewer and much smaller villages in the 400-year gap between these two time ranges.

Sometime in the middle of the first millennium B.C. there was a major seismic event in the region that lowered the far western Alaska Peninsula approximately six meters. This event created a new waterway that cut through the peninsula at Big Lagoon in Morzhovoi Bay and broke through the barrier beaches to the Bering Sea, thus creating a new tip of the Alaska Peninsula (Jordan and Maschner 2000; Maschner and Jordan 2008). On this point of land, with excellent access to both the Bering Sea and the North

Pacific, a large village formed that lasted for nearly 500 years. While there is evidence of a small occupation here between 1,000 and 500 years ago, the town that developed at this location, with an estimated 500–1,000 people in the first part of the Middle Aleutian tradition, is extraordinary.

There are over 1,000 surface depressions at Adamagan, more than 75 percent of which can be associated specifically with this time period. The deposits ranged from one to three meters deep, and there are buried former house depressions in every excavation. Houses range from 30 to 80 m², but appear to get larger through time. Most houses are oval, have some sort of hearth, interior storage pits, four primary roof supports, and external storage pits. Many are well cleaned, with external middens containing dense quantities of microdebitage from floor cleaning. Internal storage pits are often capped with a flat rock, and there is usually a single stone tool in the bottom of each. It is not uncommon to find a walrus skull buried in the floor below a house. Other internal features include a lamp and carbon-crusted griddle stones (Knudsen 2004). External shell midden areas are dense, but not extensive and usually found in an abandoned house depression next to the excavated structure.

The stone-tool assemblage represented at Adamagan is the most complex and specialized in the entire Aleutian sequence with more than 50 tool types. Hallmarks for this time range include the fishtail endblade that may have been used on early arrows (Figure 13.2), notched and hafted knives and scrapers, a variety of ground and polished chisels and burins, the first true toggling harpoons of the form so common in Bering Straits somewhat later in time, bilateral fixed harpoons with a line hole, and the greatest use of net sinkers in the entire chronology.

Gone are the anthropomorphic figurines and masks from the latter half of the Early Aleutian tradition, which are replaced with items of individual identity (Figure 13.5). Labrets, nose pins, beads, ear ornaments, and geometric designs on harpoons are now common. Subsistence is diverse, with nearly every harvestable resource from both the North Pacific and Bering Sea represented in the middens.

Adamagan arose at a time of cooler sea-surface temperatures. The combination of a novel site location with increasing marine productivity resulted in rapid population growth. This is not an isolated settlement. There are sites throughout the region dating to this time period, at least one other with over 200 houses. There are over a dozen smaller sites as well on the Shumagin Islands (Johnson 1988; Johnson and Winslow 1992), Sanak Island (Reedy-Maschner and Maschner 2012), and along both shores of the peninsula. While sites in this time period are rare in the eastern Aleutian Islands, the small occupation at Summer Bay on Unalaska (Davis and Knecht 2010) and a small occupation at Chaluka on Umnak Island (Misarti and Maschner 2015) indicated that there was a presence in those islands while Adamagan was occupied.

About 2,050 years ago, the people at Adamagan stopped harvesting shellfish—there are no preserved middens. By 1,900 years ago, the village was abandoned, as were nearly all of the smaller villages occupied at this time. Three small villages immediately arose, XCB-005 in Izembek Lagoon, Ram's Creek in King Cove, and a small one along the southern fringe of the Hot Springs site. The houses are much smaller, occupations more

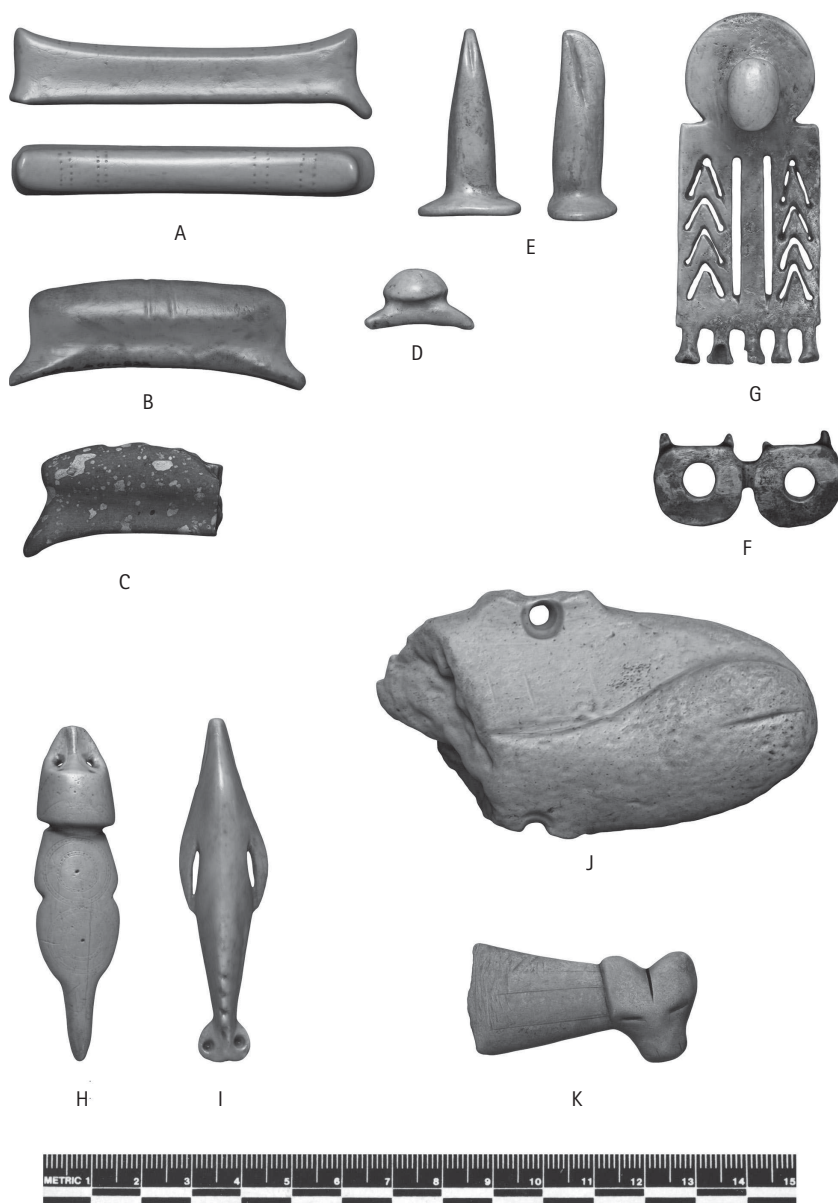


FIGURE 13.5 Items of body adornment for the western Gulf of Alaska and the southern Bering Sea. (a) decorated labret, Hot Springs Village, 1600–1200 B.P.; (b) labret, Adamagan, 2300 B.P.; (c) stone labret, Sapsuk River, 2200 B.P.; (d) marble labret, Hot Springs Village, 1600–1200 B.P.; (e) bird-beak labret, Hot Springs Village, 1600–1200 B.P.; (f) nose ring, Adamagan, 2200 B.P.; (g) ivory cheek labret or ear piece with chevrons and dot motifs, Adamagan, 2300 B.P.; (h) ring seal figurine with circle-dot motif, Hot Springs Village, 1600–1200 B.P.; (i) whale figurine, Hot Springs Village, 1600–1200 B.P.; (j) bowhead whale sculpture, Hot Springs Village, 1600–1200 B.P.; (k) fox sculpture, Hot Springs Village, 1600–1200 B.P.

Image compiled by Nicholas Clement and Herbert Maschner

ephemeral, and the technological system reworked. Only one fishtail point, out of hundreds of formal tools, was found at each of these sites. Not only are the fishtail projectiles gone, but so are the majority of notched net sinkers (Maschner et al. 2010), most of the harpoon styles, all of the notched and hafted knives and other specialized tools. Present for the first time are small arrow points and at two sites (Maschner and Mason 2013), a few fragments of Norton-like pottery and polished slate have been found, both about 2000 B.P., or right on this transition (Maschner 2004c).

These smaller villages arise after the collapse of the larger towns, and during a time often referred to as the Roman Warm Period (Ljungqvist 2010; Richter et al. 2009). Like all warmer periods before, populations decline, and houses and villages get smaller. This lasts until about 1500 B.P., at which point larger villages again develop, and shellfish are harvested, resulting in massive middens. The most spectacular of these is found at Hot Springs, where over 100 house depressions appear to be occupied. This is a dense village occupation with several meters of cultural debris.

There is clear status differentiation in burials, with one individual surrounded by porpoise skulls (Okada et al. 1984). There are many items of body ornamentation, much like Adamagan, but now are added zoomorphic figurines of seals, caribou, foxes, and whales (Figure 13.4). A suite of harpoon types, at least two forms of arrow points including the small Ram's Creek points of the previous warmer era (Figure 13.3), and an endless variety of bone and ivory tools, and parts for composite tools. Hot Springs at 1500–1300 B.P., much like its earlier occupations, is one of the only large middens in the region. This is probably because as the furthest-north shell midden in the Bering Sea, it is subject to pack-ice conditions (which destroy the intertidal resources), therefore it is occupied only during periods of warmer conditions, periods when much of the rest of the region is abandoned or populations go into decline. Subsistence at Hot Springs appears to have been dominated by walrus, ring seals, birds, and cockles. The cockles form a midden across the site up to a meter deep extending for thousands of square meters (Maschner 2004b; Okada 1980; Okada and Okada 1974; Okada et al. 1976).

One other notable site is a medium-sized village on the north side of Sanak Island. This site had an extensive shell midden deposit, it dates to the same two centuries, had burials in whale-bone enclosures, and large oval to round houses in the 80 m² range, much like Hot Springs. Here the people harvested sea lions, harbor seals, cod, and some salmon (Reedy-Maschner and Maschner 2012).

The size of spear points and the number of large sea mammals in the assemblage begin to increase about 1,500 years ago. So much so that it can be assumed that both sea lions and walrus are becoming more common near-shore, or the Aleut finally developed the full ocean-going kayak, which would have allowed them to go much further offshore and in a greater variety of weather conditions (Maschner et al. 2014). It certainly would have made it possible to travel to haul-outs and rookeries, dispatch shore-bound animals, and return them to villages. Another piece of evidence to support this assertion is that they stop making toggling harpoons, implying that they no longer are hunting open-water sea mammals. But this strategy does not last.

One of the most interesting developments during the Middle Aleutian tradition is the development of mummification (Hrdlička 1941; Laughlin 1980, 1983), mirrored in the Kachemak tradition of Kodiak Island with the defleshing and rearticulation of skeletons (Simon and Steffian 1994; Workman 1992). Maschner has argued that the fact that two regions with very similar mortuary cults involving ancestor worship, must have a common genesis and is a fairly clear sign that the eastern Middle Aleutian and the Kachemak share an evolutionary legacy (Maschner 2008). The simple recognition that mummification continues in the Aleut region into the Late Aleutian tradition, but is not present on Kodiak when the Kachemak are replaced by the Koniag, is substantial evidence that the Koniag (Yupik Eskimo speakers), are recent migrants to the region (Maschner et al. 2009b).

At the end of the Middle Aleutian tradition in this region there is a complete shift in settlement and an expansion of populations, associated with the transition between Paleo- and Neo-Aleuts (Misarti and Maschner 2015). There are few coastal settlements on the Alaska Peninsula. Instead, they move from the coast onto red salmon spawning streams. In fact, nearly every peninsula village in the study area dating between 1,300 and 1,000 years ago is on a salmon stream. There are no shell middens, but houses get larger, villages get larger, and there are many more of them in a diversity of riverine landscapes. Especially in Izembek Lagoon, along the rivers draining into Nelson Lagoon, and for the first time along the salmon systems of the north shore of Unimak Island, villages are everywhere. None of the most important locales critical to sea-mammal hunting and offshore fishing in the previous 3000 years are occupied. There is also, for the first time, the occupation of defensive rocks, islets, and other landforms that were historically associated with warfare (Maschner and Reedy-Maschner 1998). This is the time period that Finney has identified as a ramping up of red salmon productivity on the North Pacific (Finney et al. 2002, 2010), but it is also a period of marine instability as it transitioned into the Medieval Climatic Anomaly (Maschner et al. 2009b; Misarti et al. 2009). The result was a complete shift in settlement patterns and subsistence.

LATE ALEUTIAN TRADITION

When the Russians and British first arrived in the Aleutian Islands, the Aleut were living in large, multifamily residences. These semisubterranean structures were roofed with driftwood or whale bone, and covered with sod. They were strong, and the residents often used the roof as a sitting and task area (Liapunova 1996; Veniaminov 1984 [1840]). These houses were either large round to oval structures, or had a longhouse shape. They had roof entrances, a shallow trench around the inside of the walls where people sat and worked, central subfloor storage facilities, perhaps a hearth, and there were tunnels that left the main room to small chambers that surrounded the main house, where things were stored and children slept (Hoffman 2002). A log ladder led to a roof entrance. These houses were often huge and could be 300–500 m² in size if the side rooms are included

in the calculations. This means that 50–100 people were living in a single house: a massive increase in corporate group size when compared to earlier time periods.

Archaeologically, these structures are found as a large central depression surrounded by a number of small pits that were the side rooms. On the Alaska Peninsula these are called “nucleus-satellite” houses (Maschner and Hoffman 2003) and are the signature or even the type fossil of the Late Aleutian tradition. But this time period has considerable variation across time and space, variation tied closely to changes in climatic regimes.

The Late Aleutian tradition is visible first about 900 years ago (A.D. 1100), coincident with the Neo-Aleut expansion (Misarti and Maschner 2015). All of the villages along the rivers are abandoned and two villages arise, both in the Izembek Lagoon area; neither is near any source of salmon, both being situated on coastlines with open Bering Sea access but no intertidal resources. These villages are composed of six to eight large nucleus-satellite houses with 150–350 m² of floor area. Houses are filled with whale bone but there are no shell middens at either of these sites. McCartney conducted excavations at XCB-001, later mapped by the BIA ANCSA crews, and briefly tested and dated using accelerator mass spectrometry (AMS) by crews from the Lower Alaska Peninsula Project. Here McCartney identified the Izembek point, a large, weakly stemmed end-blade with distinctive tangs on the shoulders. Arrow points are gone. There are no true toggling harpoons, but single barbed harpoons with an offset line hole are present, a unique development for this time period.

The size of these houses indicates the rise of large, multifamily corporate groups. Concurrent with this development, storage facilities appear to move from outside of houses to inside, indicating a desire to control access to some resources by these households. These two villages are present for about 100–150 years, but by 750 years ago (A.D. 1250) they are abandoned. This 150-year time period is poorly recognized in the eastern Aleutian region. Maschner and Hoffman (2003) have argued that this is the point at which more formal status differentiation arose in the region, although variations in political and economic complexity have been in place for nearly 3,000 years by this time (Maschner and Bentley 2003).

The next 200 years is a period of population collapse (also seen on Kodiak Island) (Maschner et al. 2009b). Sites become very small, with one to three round houses in the 40–70 m² range, and storage pits are now found outside of the houses. It is as if the large villages of many corporate households broke up into villages of a few families. But there are not enough villages in this time range to account for the massive villages of the previous 150 years. All indications are that this was a period of rapid population decline and decreasing complexity.

These villages are found along the length of the western Peninsula, with one to three houses located at Hot Springs, in Izembek Lagoon, in Middle Lagoon, at Adamagan, and on Unimak Island. There are occasional middens of intertidal remains at these small sites, and a few bones of phocids, cod, and salmon, but little else. Izembek points are still being manufactured and are still the dominant projectile type.

At XCB-003 in western Izembek Lagoon, McCartney made a spectacular discovery that highlights the strangeness of this 200-year period (McCartney 1974; Maschner

2004c). A house constructed of nearly 30 large whale mandibles was discovered and excavated. Inside, McCartney found both the Izembek points of the local chronology, but also a complete Eskimo-style assemblage from the upper Alaska Peninsula, including all of the slate endblade types and pottery found in the Brooks River camp and Kukak Beach phases on the upper Alaska Peninsula (Dumond 1981; and see especially Dumond 2003). Also found was a dense concentration of notched stone net sinkers, still made in Bristol Bay but absent in this region for the previous 600 years at least. Even stranger was the discovery of several Adamagan-style fishtail endblades, which have been gone from this region for over 1000 years. Multiple AMS dates place this occupation at A.D. 1350, exactly the time period when these same slate and ceramic technologies are found in the Bristol Bay region (Yupik). It was argued previously that the fishtail blades are probably from mixing with an earlier stratigraphic level during house construction, but this cannot be confirmed (and may be the case with the net sinkers as well). But the Izembek points are common at this time and it appears that a group of Eskimo peoples from the east arrived and set up a household with a group of resident Aleut.

By 500 years ago (A.D. 1450–1500), everything had changed. The nucleus-satellite houses are back. Storage is again attached to the houses or inside. Villages rise from one to three small houses, to 7–30 massive corporate houses (Maschner 2004c; Maschner and Hoffman 2003). The region sees a shift from seven small villages to 12 massive villages. All population estimates indicate an increase from about 300 people to perhaps 15,000 people by 400 years ago (A.D. 1600). All of these sites are located in proximity to a large sockeye salmon system, and nearly every large sockeye system has one of these sites. They extend from Bear River (Okada et al. 1979) and the Nelson River Drainages (Knudsen and Maschner 2005) on the east all the way to the northwest end of Unimak Island (Maschner and Reedy-Maschner 1998). Large villages are also found on Sanak Island (Reedy-Maschner and Maschner 2012) and individual houses in the Shumagin Islands (Johnson and Wilmerding 2001; Wilmerding 2005). There is a heavy subsistence emphasis on sea mammals, especially sea lions and whales, and salmon remains are dense in some sites. Izembek points are still made, providing continuity through these major changes in households and settlement.

While many of these sites have been briefly tested and dated, only one has been excavated. Hoffman's excavations at Agayadan Village on the north shore of Unimak Island found all of the features identified by early explorers for these houses. This included a large central chamber, a shallow trench around the inside of that chamber, side rooms with connecting doors, and internal storage facilities (Hoffman 2002; Hoffman et al. 2000).

For the first time in this later Holocene sequence, a similar expansion is occurring in the eastern Aleutian Islands, but with a notable difference. Instead of 7–30 houses up to 300 m², the villages in the eastern Aleutian Islands have one or two massive rectilinear longhouses, but still with attached rooms. This is best seen at Reese Bay, where Veltre and McCartney (2001) excavated houses that were up to 700 m² in floor area (for a complete discussion of the regional differences, see Hoffman 2002). A similar difference can be seen between the northern and southern Northwest Coast, and is often associated

with the difference between matrilineages and patrilineages. Because of the reproductive limits of females in these societies, matrilineages cannot get larger than about 40–60 members, while patrilineages in concert with polygyny, can rise to hundreds of members (Ames and Maschner 1999). These differences in household size and organization may reflect just this patterning. Google Earth mapping of these types of villages indicates that the break between the smaller houses in the east and the larger houses of the west occurs at Unalaska Island, because the late villages of the Krenitzen Islands look more like the Alaska Peninsula communities. Further evidence that these two regions are on different trajectories is found in their tool assemblages, which have little in common. In fact, they are so different that there is little to suggest much social interaction during this time, and much to indicate that there was considerable warfare across the North Pacific (Maschner and Reedy-Maschner 1998).

The Late Aleutian tradition along the western Alaska Peninsula and far eastern Aleutian Islands is convoluted. The abandonment of the rivers by 900 years ago, and the rise of the large villages of corporate households correlate closely with a measureable decrease in salmon runs during a warm spell in the Medieval Climatic Anomaly. But the transition to the coast and the rise of large, corporate households were short-lived solutions. The warming sea-surface temperatures, leading to a significant decline in sea-mammal populations and perhaps requiring a new emphasis on whaling, was not sustainable. This led to a 200-year population collapse and disintegration of Aleut society in this region (Maschner et al. 2009b). The return of large households and the rise of the massive late villages occur during the peak of the Little Ice Age, a period of phenomenal increase in marine productivity, both for anadromous fish and for sea mammals (Maschner et al. 2014). This increase in productivity, the increase in access to sea lions for boat covers, and the now fully developed kayak led to a massive increase in human populations (Maschner et al. 2009a; Maschner and Hoffman 2003).

NOTES

1. All dates in this paper are calibrated years before present.
2. For all place-names and geographic features, refer to Figure 13.1.

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CHAPTER 14

THE DENBIGH FLINT COMPLEX OF NORTHERN ALASKA

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INTRODUCTION

THE Denbigh Flint complex (DFC) (Giddings 1951) represents the material culture of a population of hunter-gatherers who migrated into the North American Arctic from Siberia about 4,500–5,000 years ago (Dumond 1987; McGhee 1996; Powers and Jordan 1990). They are the first regional variant of the more widespread Arctic Small Tool tradition (ASTt) (Irving 1957, 1962, 1964), which successfully colonized and cast influence across a tremendous geographic area from southwestern Alaska to Greenland. People associated with the ASTt displaced or followed Northern Archaic populations along the coast and interiors of northern and western Alaska and were the first humans to settle the recently deglaciated High Arctic of Canada and Greenland. The development of the DFC marks the advent of cultural patterns that would exhibit continuity over the next 3,000 years across broad swaths of the coastal and tundra zones of the North American Arctic and lay the groundwork for adaptations of future northern peoples. These patterns include specialized maritime adaptations, use of the bow and arrow, and production of tools through grinding and polishing. This chapter is an overview of the DFC expression of the Arctic Small Tool tradition (ASTt), which is centered in northern Alaska and was the apparent progenitor of the ASTt in North America.

DEFINING DENBIGH

The DFC is the initial western Arctic manifestation of the more broadly conceived ASTt (Irving 1957, 1962), which includes related and coeval complexes known as the Brooks

River Gravels phase of southwest Alaska (Dumond 2005) and pre-Dorset, Saqqaq, and Independence I cultures from the eastern Canadian Arctic and Greenland (Maxwell 1980). Some have expanded the ASTt definition to include ancestral and contemporaneous groups of Siberia (Powers and Jordan 1990), while Anderson (1979) modified Irving's concept to include descendent Alaskan cultures others refer to as the Norton tradition (Dumond 1982). Broadly speaking, the ASTt can be seen as a widespread circumpolar tradition that geographically spans from northern Eurasia east to Greenland (Powers and Jordan 1990).

Denbigh sites are recognized in the archaeological record based on a series of distinctive stone tools and technologies that include tiny, precisely flaked tools that are part of a remarkably cohesive toolkit and the namesake of the ASTt. At present there is a robust sample of more than 140 sites with Denbigh occupations. These deposits date to approximately 4000–3300 years B.P. (1450–2450 cal B.C.) and encompass a broad geographic area that includes coastal and interior settings stretching from Norton Sound in western Alaska to the Mackenzie River delta in the Northwest Territories, the entire span of the Brooks Range, and British Mountains of northern Alaska and Yukon Territory (Figure 14.1). In southern Alaska this group is referred to as the Brooks River Gravels phase and is considered a distinctive variant of the ASTt (Dumond 2005), though some consider this and the DFC to be one and the same. The cohesiveness of the toolkit over such a broad geographic area suggests a high level of interaction and communication among the people who created these sites. It is unclear if the DFC represents more than an analytical construct where these remains can be shown to represent a distinct culture in an ethnographic sense, which includes shared language, biology, beliefs, and cultural practices, or if these materials mark the radiation of a technological tradition through existing disparate populations.

Diagnostic tools and techniques that occur in the DFC include mitten-shaped or stacked-step burins (Figure 14.2:m), the triangular or cuboid-shaped utilized burin spalls derived from them (Figure 14.2:n), and small tools, most particularly bifacially worked sideblades and endblades, many of which exhibit very fine, parallel-oblique pressure flaking (Figure 14.2:a–i). There are some continuing aspects of Denbigh lithic technology in the later Choris, Norton, and Ipiutak complexes. Bifacial sideblades and endblades, for example, continue to be used, but in later assemblages they are seldom as delicate and finely made as in Denbigh. The bipointed endblade form (Figure 14.2:a–b) is lacking in later assemblages. In addition, other technologies such as microblade production are absent from these later cultural complexes, and thus when they are recovered in association with typical Denbigh tools they serve as good diagnostic indicators of a Denbigh assemblage.

CHRONOLOGY

Interest in the age of the Denbigh Flint complex has a long history (Anderson 1988; Giddings 1951, 1964; Harritt 1998). As a result, at least 120 radiocarbon dates from 32 Denbigh contexts have been produced in the past six decades (Slaughter 2005), but not

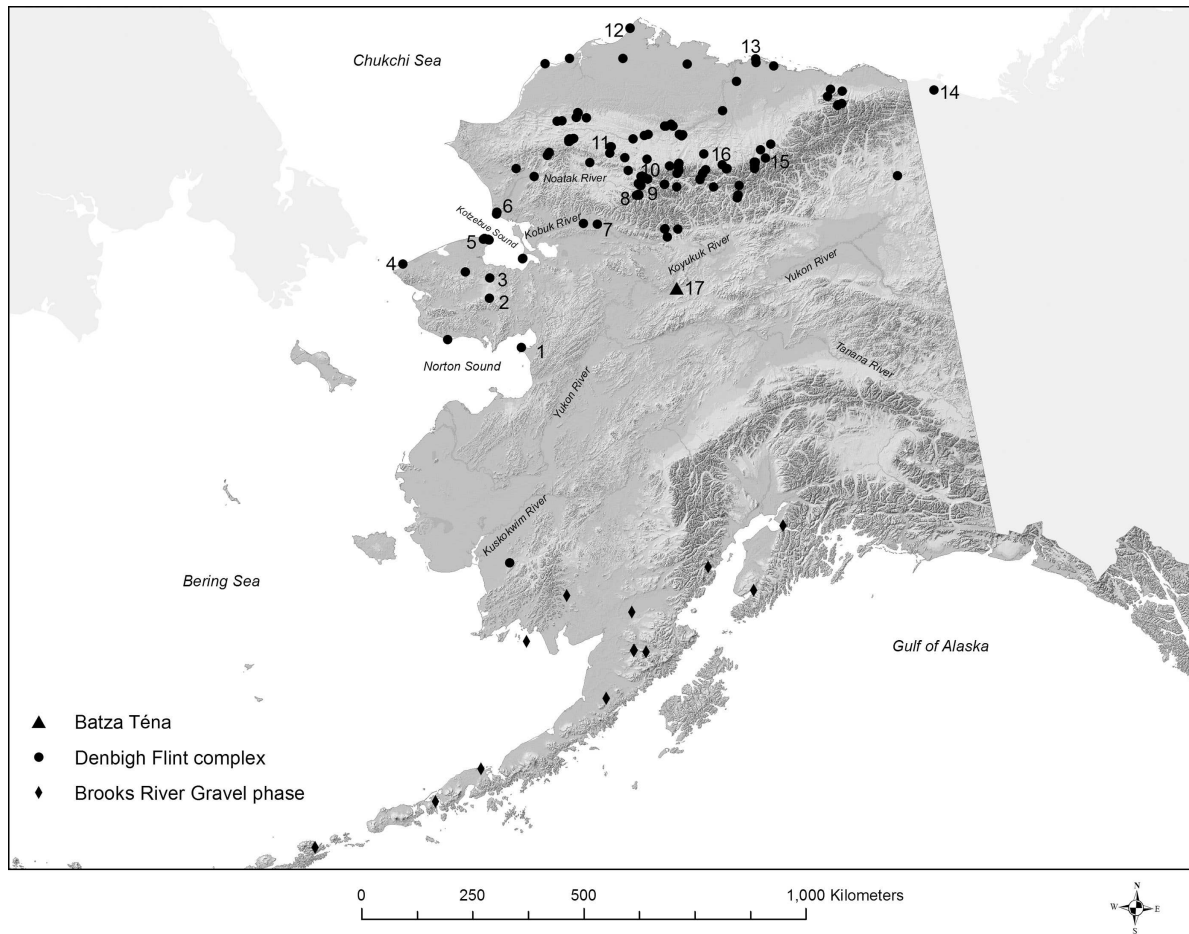


FIGURE 14.1 A map of Denbigh Flint Complex sites mentioned in the text: (1) Iyatayet (2) Kuzitrin Lake (3) Trail Creek Caves (4) Agulaak (5) Cape Espenberg (6) Cape Krusenstern (7) Onion Portage (8) Matcharak Lake (9) Kipmik Lake and Etivlik Lake (10) Kurupa Lake (11) Croxton (12) Walakpa and Coffin (13) Prudhoe Bay sites (14) Engigstciak (15) Mosquito Lake (16) Imaigenik; Obsidian Source: (17) Batza Téna.

Map produced by Andrew Tremayne

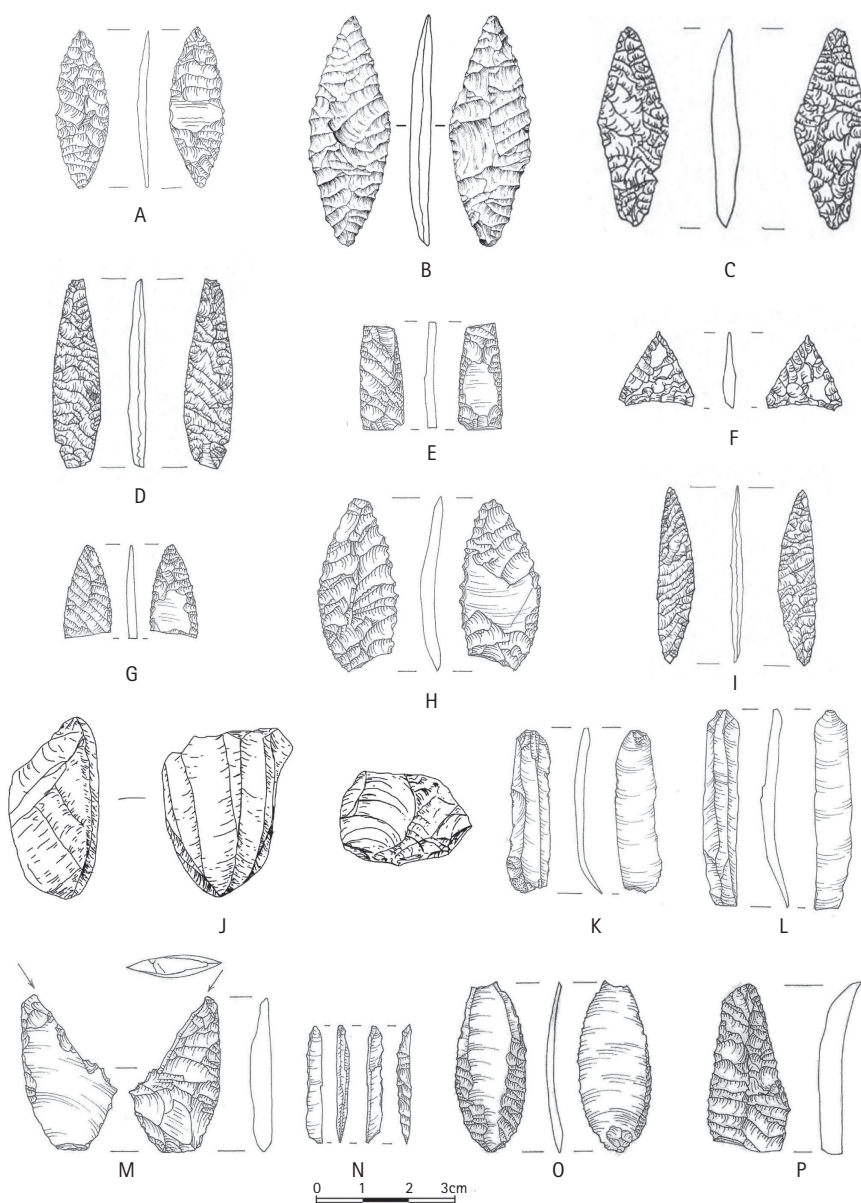


FIGURE 14.2 Selection of Denbigh Flint complex stone tools. (a–b) Matcharak: bipointed end blades; (c) Cape Espenberg: endblade; (d) Iyatayet: obsidian endblade; (e) Matcharak: endblade; (f) Cape Espenberg: harpoon end blade; (g–h) Matcharak: sideblades; (i) Cape Espenberg: sideblade; (j) Onion Portage: microblade core (redrawn from Anderson 1988) (k–l) Matcharak: microblades; (m) Matcharak: mitten shaped burin; (n) Matcharak: utilized burin spall; (o–p) Matcharak: flake tools. Illustrations (a, e, g–h, k–p) Sarah Moore; (b) Eric Carlson; (c–d, f) Kelly Eldridge.

all can be considered reliable. Recent redating of archived samples or reexamination of previously dated Denbigh sites has shown that the earliest assays, in their aggregate, hold up surprisingly well as reliable measures of the age of Denbigh, but include many outliers of questionable validity due to uncertainties about sample composition, dating methods, and archaeological context. Although 120 dates seems like a sizable sample, more than half of all the dates ($n = 71$) come from six sites: Onion Portage, Iyatayet, Punyik Point, Croxton, Matcharak Lake, and Mosquito Lake (Anderson 1988; Giddings 1964; Kunz 1977, 2005; Meitl 2008; Reuther and Gerlach 2005; Tremayne 2011), and as noted, many of these dates are considered suspect.

The most reliable radiocarbon dates from clearly understood stratigraphic contexts consistently set the age of the DFC in a relatively narrow range from 4000 to 3300 years B.P. (1450–2450 cal B.C.), a slightly later and briefer interval than previously recognized. If emphasis is given to the most trustworthy dates—AMS assays of single pieces of charcoal from short-lived plant taxa or bone from animals with a terrestrial diet in a well-understood stratigraphic context, and with clear associations to Denbigh artifacts—two longstanding questions related to Denbigh chronology are clarified. First, there is little radiocarbon evidence to support an early developmental “proto-Denbigh” (Anderson 1988) phase in the western Arctic, as had once been suggested. Second, evidence for a very late-lived manifestation of DFC now appears to be a result of sample contamination and lab errors.

The oldest reported date is from the type site of Iyatayet, which provided one date on bulk charcoal of 5063 ± 315 B.P. (C-793). This date is considered suspect due to large standard deviation and method of collection (Giddings 1964; Harritt 1998). The BEN-053 site at Kuzitrin Lake has yielded the oldest radiocarbon dates considered viable, at 4750 ± 170 B.P. (Beta-39518) and 4770 ± 250 B.P. (Beta-39514), although the standard deviations are very large, and potential stratigraphic mixing calls into question a secure context for at least one of the features dated (Dumond 2001; Harritt 1998:69). The Kuzitrin dates have garnered a great deal of attention and scrutiny, as they provide the long sought-after evidence that ASTt migration spread from Alaska east. However, the oldest securely dated DFC sites are consistently 500 years younger than Kuzitrin Lake and DFC components with dates of over 4000 RCYBP (2530 cal B.C.) are exceptionally rare.

The youngest radiocarbon dates for Denbigh suggest this culture persisted up to 2200–2500 years B.P. (Slaughter 2005). These later dates have been reported primarily from interior sites such as Croxton (Gerlach and Hall 1988), Punyik Point (Irving 1964), and Mosquito Lake (Kunz 1977). Irving (1964:320) questioned the validity of the 2600 B.P. date (Lab # P-64) from Punyik Point, and the others have been shown to be too young due to lab error. For example, Reuther and Gerlach (2005:364) demonstrate dates assayed by the Dicarb radiocarbon dating lab were systematically too young by 350–1140 years. Samples that produced the dates of 2210 ± 155 (DIC-2465) and 3350 ± 60 (DIC-2469) were crosschecked and redated to 3650 ± 50 (2190–1890 cal B.C.) (Beta-136257) and 3760 ± 40 (2290–2040 cal B.C.) (Beta-134995). Recent (unpublished) assays of material collected from the same context as the samples (GX-4075 and GX-4079) that produced young dates at Mosquito Lake were redated by AMS to 3440 ± 30 (1878–1664

cal B.C.) (Beta-319841) and 3310 ± 30 B.P. (1661–1509 cal B.C.) (Beta-319842), implying the younger than expected dates are in error. The sites of Walakpa and Coffin have also been interpreted as Denbigh-Choris transitional sites based on a younger than expected date and the presence of pottery (Stanford 1971). New radiocarbon dates from the Coffin site of 3530 ± 30 (1950–1750 cal B.C.) (Beta-197899) from feature 2, 2460 ± 50 (790–400 cal B.C.) (Beta-197898) from feature 1, and 2630 ± 60 (900–770 cal B.C.) (Beta-197900) from feature 3 support an interpretation of multiple occupations by Denbigh and Choris or Norton people (Dennis Stanford 2012, personal communication). The youngest certain DFC dates are 3300 ± 40 B.P. (1684–1498 cal B.C.) from two sites: charcoal from Punyik Point (Beta-193795) (Kunz 2005) and sewn birch bark from Iyatayet (Beta-319843) (this chapter).

ORIGINS AND SPREAD

The origin of the DFC remains somewhat of a mystery. Researchers have drawn links to the Paleoarctic tradition based on microblades and edge-inset weapons, but debate exists about whether this transition occurred on the Siberian or Alaskan side of the Bering Strait (Anderson 1988; Maxwell 1980). Proponents of the Alaskan origins for Denbigh must contend with the presence of the distinctly unrelated Northern Archaic tradition, which presents a major obstacle to a clear line of descent. For this transition to have emerged in Alaska there would have to be evidence for a late expression of the Paleoarctic tradition that coexisted in time with the Northern Archaic. Solid empirical evidence for this hypothesis is lacking or ambiguous. No transitional assemblages of the proper age have so far been found in Alaska and instead the package of traits that characterize Denbigh appear whole and fully formed within a very brief interval of time. As such, focus has turned toward Asia, where the ultimate origins of the ASTt are thought to be found.

The general consensus is that ASTt, and thus DFC, represents people descended from the Neolithic Syalakh and Bel'kachi cultures located in the Aldan and Lena regions of Siberia between 5200 and 6200 B.P. (Ackerman 1998; Dumond 1987; McGhee 1996; Powers and Jordan 1990). Here stone-tool technology bears a remarkable resemblance to the later Denbigh tools in Alaska, including microblades, multifaceted burins, and intricate parallel-oblique flaking patterns on endblades (Mochanov 1969)—a trait lacking in the American Paleoarctic tradition (see Anderson 1988). While the stone-tool technology is undoubtedly related, the Siberian ASTt also comprises a number of elements that do not appear in Alaska until after Denbigh times, including cord-marked pottery (Mochanov 1969).

The distribution of sites with ASTt elements in Siberia is centered in the Aldan region but still present across much of eastern Siberia, including the Chukchi Peninsula (Powers and Jordan 1990). No DFC sites have been found on the easternmost coastal extent of Siberia, which confounds efforts to show direct continuity between Alaska and Siberia, and clouds our ability to decipher the economic and ecological conditions that

prompted the migration across the Bering Strait. The lack of early coastal sites may be related to the rise in sea levels, which appear to stabilize near modern levels approximately 6,000 years ago (Mason et al. 1997). Recent work by Maschner et al. (2010) discovered an apparent, early ASTt site along the Sapsuk River in Southwest Alaska which dates to 4390 ± 50 B.P. (3330–2900 cal B.C.) (Beta-249839), providing evidence that ASTt may have begun as a coastally adapted tradition prior to 4,500 years ago. The differences between this southwest manifestation of the ASTt and the DFC have yet to be adequately addressed, but renewed interest in southwest Alaska as a more proximate cultural hearth for Denbigh is emerging.

ENVIRONMENT

DFC people were well adapted to a broad array of ecological conditions, including coastal and interior tundra environments, wherein camps were placed adjacent to productive coastal shores, lakes, and riverine biomes. Denbigh people were apparently comfortable inhabiting treeless tundra but also the forests of the Kobuk River valley, where they likely encroached on Northern Archaic territory. The Denbigh would have had access to a wide array of marine resources, primarily bearded and ringed seals; riverine and lacustrine resources, including migratory and resident fish and birds; and terrestrial resources dominated by caribou, muskox, Dall's sheep, and perhaps moose in the southerly reaches of their territory. Small mammals and ptarmigan were likely fall back foods, and storage probably played a significant role for provisioning throughout the long winter. Paleoecological studies for the Brooks Range of Alaska suggest the modern vegetation regime was in place by 4,000–5,000 years ago (Anderson and Brubaker 1994), making it likely that the modern suite of fauna was similar too.

When Denbigh people first appeared in northwestern Alaska ca. 4,500–5,000 years ago, the climate was shifting from a relatively wet, cool period toward a warm and dry one (Anderson et al. 2001). Paleoclimatic proxies for the Holocene show the Alaskan Arctic has experienced three major cooling periods interrupted by long periods of warm, dry weather. Following the Younger Dryas cold snap (12,800–11,500 B.P.) were many millennia of warm temperatures, referred to as the Holocene thermal maximum (HTM), lasting until around 6000 B.P. Stable $\delta^{18}\text{O}$ isotope values derived from lake cores in the Brooks Range show that by 5700–4700 years B.P. a wet, cool period had set in, ending the HTM (Anderson et al. 2001). These findings are closely supported by geologic studies of terminal moraines in the Brooks Range, which indicate increased snowfall led to glacial advances at this time (Calkin 1988). A stable, warm, dry period begins around 4,000 years ago (Clegg and Hu 2010), with another major drop in temperatures around 3200–3500 years B.P. (Anderson et al. 2001). The environment Denbigh people would have been confronted with most likely was a warm, dry period, a climatic setting that may have suited large caribou populations and possibly reduced biomass in marine habitats (Mason and Gerlach 1995).

ECONOMY

Denbigh people are generally thought to have organized their economic pursuits around terrestrial resources with seasonal visits to the coast to procure seals (Dumond 1987; Giddings 1964; Giddings and Anderson 1986). Most interpretations emphasize caribou as the main food and raw-material staple (Ackerman 1998; Anderson 1988; Dumond 1982; Giddings 1964). Denbigh people were likely highly mobile, and there is strong evidence for extensive trade or movement of obsidian across distances over 500 km from the source.

Subsistence

Twenty-five Denbigh sites report associated animal remains, but only 13 have diagnostic artifacts and dates (Table 14.1). Included in this list are a few sites with questionable contextual integrity. Of these, Trail Creek Caves, Engigstciak, Walakpa, and Coffin are the most important to discuss. Trail Creek Caves and Engigstciak have evidence suggesting Denbigh people may have hunted wapiti (*Cervus elaphus*), along with caribou and sheep (Larsen 1968), although the Trail Creek specimen is undated, and the Engigstciak find may postdate the Denbigh occupation of that site. Walakpa and Coffin deserve mention because they have Denbigh tools in probable association with a variety of terrestrial and maritime mammals. If confirmed, this would alter our understanding of Denbigh maritime adaptations as the reported fauna include walrus, bearded seal, and porpoise (Stanford 1971).

After careful review, only seven sites provide unequivocal association of faunal remains with Denbigh tools and dates: Iyatayet (NOB-002), Matcharak Lake site (AMR-186), Cape Espenberg Denbigh Clinker site (KTZ-325), Punyik Point (XHP-308), Onion Portage (AMR-001), Imaigenik (XCL-414), and Tingmiukpuk (KIR-273). Based on these modest assemblages, caribou was clearly the most important resource to the interior Denbigh economy and seals on the coast. The interior lake sites of Punyik Point and Matcharak Lake have middens dominated by fractured caribou bones (Irving 1964; Tremayne 2011). These sites also make it clear that Denbigh hunters supplemented with Dall sheep, porcupine, marmot, Arctic ground squirrels, ptarmigan, ducks or geese, and many freshwater fish species, including Arctic grayling, lake trout, northern pike, and burbot (Tremayne 2011).

Despite the apparent focus on terrestrial resources, the high frequency of coastal sites suggest sea-mammal hunting played a significant role in the Denbigh subsistence economy, and as such, Denbigh is considered to represent the first "maritime hunters" in northwestern Alaska (Ackerman 1998; Giddings and Anderson 1986). An unresolved issue is the degree to which Denbigh people emphasized marine resources and possessed specialized marine adaptations. If the Denbigh culture is derived from an inland terrestrial-hunting population, then their maritime adaptations must have developed around 4,000 years ago, perhaps as part of a strategy to buffer against fluctuating caribou populations or to supply to their diet foods rich in nutrients (fat). A competing scenario is that Denbigh people arrived from Asia preadapted to exploitation of maritime resources

Table 14.1 Denbigh Flint Complex Sites with Reported Faunal Remains

Site	Contextual Integrity	Species	Notes	Reference
Onion Portage	High	Caribou and undetermined fragments	Preservation poor	Anderson 1988
Matcharak Lake	High	13 species: Caribou, Dall's Sheep, Small Mammals, Birds, 4 Species Fish	NISP 2105; 90% caribou	Tremayne 2011
Lake Matcharak Peninsula	Medium	Caribou	MB Core and DFC date	Tremayne 2010b
Walakpa	Medium	Caribou, Muskox, Bearded Seal, Small Seal, Fox, King Eider, Goose, Walrus (?)	Possible mixing; walrus ivory	Stanford 1971
Coffin	Medium	Caribou, Bear, Fox, <i>Canid</i> sp., Porpoise, Dolphin, King Eider, Bearded Seal	Possible mixing	Stanford 1971
Trail Creek Caves	Medium	Caribou, Wapiti, Ptarmigan, Arctic Ground Squirrel, Arctic Hare, Fox	Possible mixing	Larsen 1968
Tingmiukpuk	High	Caribou	Direct date on caribou bone	Rasic 2015
Cape Espenberg Clinker	High	Small Seal	DFC dates; endblade	Tremayne 2012
Iyatayet	High	Seal	DFC type site	Giddings 1964
Imaigenik	High	Caribou	Direct date on caribou bone	Wilson 2008
Central Creek Pingo	Low	Caribou, Waterfowl	Possible mixing	Lobdell 1995
Punyik Point	High	Caribou, Fish	Preservation level unclear	Irving 1964
Engigstciak	Medium	Caribou, Wapiti, Sheep	Possible mixing	MacNeish 1956

(Maxwell 1980); however, as noted, evidence for coastal ASTt sites on the western side of the Bering Strait is lacking (Anderson 2005). McGhee (1996) argues Denbigh ancestors were specialized caribou hunters in Asia, and rather than boating across the Bering Strait, they walked across the ice and moved inland to continue a lifestyle focused on terrestrial resources. This model implies that maritime adaptations follow terrestrial ones and must have been invented as ASTt migrated east into Canada and Greenland.

While a presence on the coast implies use of marine resources, preserved bones confirming such use is exceedingly rare. Nonetheless, three seal bones recovered at Iyatayet in a

clear Denbigh context prompted Giddings (1964:242) to speculate they were proficient “seasonal” seal hunters who likely had kayaks and harpoon technology. A recent survey of the older beach ridges at Cape Espenberg revealed a DFC site with preserved sea-mammal oil-encrusted sand embedded with seal bones and tiny flakes (Tremayne 2015). Two radiocarbon dates on associated charcoal samples (Beta-305874 and 305875) produced assays of 4100 ± 40 B.P. (2871–2497 cal B.C.) and 3880 ± 30 B.P. (2467–2247 cal B.C.), providing empirical support for an early DFC maritime adaptation.

Trade

Obsidian sourcing studies have provided the clearest evidence for trade and interaction between Denbigh people and their Northern Archaic neighbors. Obsidian from the Batza Téna source located on the Koyukuk River, south of the Brooks Range, is common in many Denbigh sites despite this source being well outside the known distribution of Denbigh sites and inferred Denbigh territory (Anderson 2005). To date, no Denbigh sites have been discovered at or around this source, which implies trade with Northern Archaic people who likely controlled this area. The distribution of Batza Téna obsidian in Denbigh sites spans from Norton Sound and the Seward Peninsula across the Brooks Range and east to sites on the Firth River, revealing widespread exchange networks were in place soon after the colonization of this area.

The spread of raw materials and ideas to and from Asia was also likely. Four Denbigh sites, Iyatayet (NOB-002), Onion Portage (AMR-001), Aqulaak-3-3 (TEL-012), and KTZ-333, with an uncalibrated date of 3880 ± 50 B.P. (AA103002) at Cape Espenberg, contains obsidian sourced to Group S, from Krasnoye Lake, near the Anadyr River in Chukotka (Cook 1995:98; Tremayne 2015). Clearly this obsidian traveled with the migrating population or through trade, which implies at least intermittent contact across the strait beginning at least 4,000 years ago.

TECHNOLOGY

Denbigh technology is an exceptionally distinctive and specialized technology embedded within an adaptive system operating within the variable ecological zones of the Arctic and Subarctic, including coastal and interior settings. There is a clear emphasis on using high-quality lithic raw materials, in particular chert from many Brooks Range sources, and obsidian. DFC technology employed multiple core reduction and tool-blank production strategies that include bifacial cores, unpatterned flake cores, and blade and microblade cores, which taken together facilitated production of many different specialized tools from a limited supply of raw material. The diminutive size of many of the finished tools is optimal for transportability and maximum edge utility (Kuhn 1994). The portable toolkit likely contained many hafted tools and bifacial cores

that could be used as chopping tools, flake cores, or modified into microblade cores (Tremayne 2015). The emphasis on high-quality raw materials, toolstone conservation, and the ability to quickly manufacture a diverse set of specialized tool forms is a technological strategy comparable to other colonizing populations, such as Clovis (Ellis 2008).

Denbigh tools have been variously interpreted as a caribou-hunting toolkit (Ackerman 1998) and as one that is multifunctional and adapted to hunting a wide range of resources in diverse habitats (Anderson 2005). Based on the variety of endblades, sideblades, bifacial knives, and projectile points, it is assumed Denbigh people employed multiple weapon systems comparable to those recovered from ASTt sites in Greenland (Grønnow 1996), where well-preserved organic elements demonstrate the use of the bow and arrow, throwing board (atlatl) and darts, and hand-thrust lances and harpoons. Microblades, endblades and sideblades were likely designed to function as insets in organic points for caribou hunting and as harpoons meant for taking seals. Harpoon technology is inferred from the triangular end blades (Figure 14.2:f), which occur only in coastal sites (Giddings 1964:233; Giddings and Anderson 1986). It is widely believed that the bow and arrow were present prior to 4000 B.P. within the ASTt, as bow parts have been found in Greenland (Grønnow 1996). Evidence in Alaska comes in the form of shaft smoothers from Onion Portage and Iyatayet that exhibit groove diameters consistent with expectations for arrow shafts (Anderson 1988). Nocked arrow shafts were collected from Walakpa (Stanford 1971), but their association with the DFC component is uncertain and may derive from the later Norton occupation.

The features absent from Denbigh technology are almost as important to understanding its character and place in the development of Arctic prehistory as the features that are present. Currently, there is no unambiguous evidence for ceramic technology in any DFC assemblages. This is a notable and puzzling absence given the clear presence of pottery in coeval and earlier Siberian Neolithic assemblages that include likely ASTt antecedents. Although ceramics occur in three ASTt sites (Walakpa, Coffin, and Engigstciak), the stratigraphic contexts of these finds are ambiguous and DFC associations are inconclusive. In at least one of these cases, the Coffin site, ceramics associated with Denbigh were interpreted as Norton in style and form (Wilmeth 1971), and recent radiocarbon dates (reported above) of the features indicate the site is multi-component. No analyses of the Walakpa or Engigstciak pottery have been published. If pottery was used by Denbigh people, it was exceedingly rare.

Ground slate—which in subsequent periods was to become a major feature of later Norton and Thule technology—is notably absent in Denbigh contexts. Instead, incipient phases of ground and polished stone working are seen and suggest the basic technology for this process developed at this time. Ground and polished jade adze bits, although rare, do occur in a few clear Denbigh contexts. Many burin bits, particularly those made of coarse stone such as basalt, were both ground and flaked. Several Denbigh assemblages contain whetstones, and a few include grooved sandstone abraders. Only one notched pebble has been reported and this was from the “Proto-Denbigh” levels at Onion Portage (Anderson 1988), implying net fishing with stone weights was rare.

Finally, there is still a lack of solid empirical evidence for boats or sleds, although their use could be implied by the ecological context of Denbigh sites. Additionally, domesticated

dogs are not currently known from any Denbigh sites (Brown et al. 2012), probably a result of poor organic preservation. Four fragmented Canid bones reported by Tremayne (2011) were subsequently shown through DNA analysis to be misclassified *Rangifer* bones.

Flaked-Stone Technology

The DFC is best known for tiny, intricately flaked stone tools. The quality of work in both masterful technique and selection of unique aesthetically pleasing raw materials has led some to regard the complex as an artistic expression of technological manufacture (Dumond 2001). During the entire span of the DFC, toolkits contain microblade technology, uniquely formed “mitten-shaped” burins, utilized burin spalls, various forms of bipointed and concave-based endblades, sideblades, flake knives, and a variety of end- and sidescrapers (see Figure 14.2 for examples) (Anderson 1988; Giddings 1964; Giddings and Anderson 1986; Irving 1964). Microblades are abundant in many Denbigh assemblages, although the cores from which they were derived are rare. While some DFC tool types continued in use in subsequent ASTt derivatives (i.e., Choris, Norton or Ipiutak), microblades and utilized burin spalls do not occur in the later phases (see Darwent and Darwent, this volume, chapter 15).

Because of the intricate and precise craftsmanship of the tiny points, utilized microblades, and burin spalls, larger tool forms are seldom discussed or are even overlooked in the field. They include: large biface cores, square- and concave-based spear points, shaft abraders, a variety of unique burin forms, large blades, and possibly percussion-flaked linear (“blade-like”) flake cores, inferred from the presence of large blade-like flakes (Anderson 1970, 1988; Giddings 1964; Giddings and Anderson 1986; Kunz 1977). Fluted points have been reported in association with Denbigh assemblages at a few locations, including the type site Iyatayet (Giddings 1964). The only example from a clear Denbigh context is the Iyatayet specimen, but a recent analysis shows that it was not purposely fluted projectile, but rather a burin-like tool with remnants of blank surfaces and resharpening flakes that superficially resemble fluting.

What we know about the function of Denbigh stone tools derives from a few, far-flung ASTt sites with preservation of organic haft elements (e.g., Grønnow 1996), analogical comparison of similar tool forms in more recent and better-preserved sites, and from a limited number of use-wear studies (Tremayne 2010a). At the frozen Saqqaq site of Qeqertasussuk in Greenland, stone tools, such as endblades, mitten-shaped burins, and microblades, were found still lashed to wooden hafts (Grønnow 1996). Based on this comparison, it seems probable that microblades were commonly used as hafted cutting tools for tailoring (Dumond 2001) and hafted burins were used not only for engraving purposes but also for scoring, splitting, and scraping antler and wood for tool production (Tremayne 2010a).

Denbigh people appear to have employed a variety of microblade core types, including cuboid with a flat base, cuboid with a wedge-shaped base (also referred to as pyramidal), barrel-shaped with a round platform, and possibly wedge-shaped cores (Anderson 1970, 1988; Irving 1964; Tremayne 2015). The cuboid (or pyramidal) form has garnered the

most attention as it is a form that departs from the more commonly manufactured wedge-shaped variety of the Paleoarctic tradition. However, Anderson (1970:10) and Giddings and Anderson (1986:290) point out that wedge-shaped cores were recognized at a number of Denbigh sites in both early and later phases; although Anderson (1988:95) stresses these forms are distinct from earlier wedge-shaped cores found in the Paleoarctic tradition as they have wider platforms and broader fluted face. Iyatayet yielded two “roughly cubical” cores, one with a flat base and the other with a wedge-shaped keel, and fragments of seven others (Giddings 1964:203). Platform and core face in these cases are roughly at right angles. The stages of DFC microblade core production are difficult to ascertain as there are so few known examples, and those that have been recovered are apparently exhausted and sometimes even recycled into other tool forms (Anderson 1988; Giddings 1964).

Denbigh microblades were presumably used as insets within projectile points and cutting tools and frequently evidence edge damage and use wear. Thirty-seven percent of all microblades at Iyatayet, for example, have traces of use, and the presence of retouch seems to be purposeful, but also at times, incidental to use. Patterns of the retouch observed include lateral, end, notched, unifacial, and bifacial flaking, as well as burin modifications (Giddings 1964). Of the 89 microblades recovered from Matcharak Lake, 25 percent were utilized (Tremayne 2015). Interestingly, obsidian microblades appear to be used differently than chert microblades. All segments of the obsidian microblades show variable amounts of use wear or retouch, whereas only medial sections of the chert microblades exhibit wear or retouch. This suggests only medial sections of chert microblades were employed in tool manufacture, while the other segments were waste. In addition, chert microblades were consistently 0.4–0.5 mm wider than obsidian microblades, though the difference was not statistically significant ($p = .051$). Variability in core form, and subsequent blade or microblade size, may be related to properties associated with different raw materials and configuration of the original nodule prior to reduction. In other words, DFC people modified their microblade core production strategy depending on the morphology of the nodule they began with.

Organic Technologies

The Matcharak Lake site (AMR-186) located in the upper Noatak River valley (Figure 14.1) contains the best-preserved faunal and organic tool assemblage for the DFC in Alaska (Tremayne 2011). At least 38 organic objects made of bone and antler were recovered from this site, including finished points or fishing barbs (Figure 14.3:c–d), preforms, flint-knapping tools (Figure 14.3:a, f–i), bone awls, wedges or slats (Figure 14.3:j), and one incised decorated foreshaft (Figure 14.3:e). Many of the artifacts are antler fragments with cut marks and burin grooves, indicating some of the production methods involved the groove and snap technique.

A total of six Denbigh sites have reported preserved organic artifacts, including Matcharak Lake. Perhaps the most relevant and underappreciated is from the “New Mountain complex” collection excavated by MacNeish at Engigstciak on the Firth River in



FIGURE 14.3 Denbigh bone and antler tools from Matcharak Lake and Punyik Point: (a) antler pressure flaker (b) antler arrow point (Punyik Point) (c–d) antler points (e) decorated bone tool (f–i) pressure flakers (j) drilled slat. Illustrations (a–b) Eric Carlson; (c–j) Sarah Moore.

the early 1950s. Organic tools include a slotted bone foreshaft, eight double-pointed bone fish gorges, awls, a possible needle, and a cut bird-bone sucking tube (MacNeish 1956:98). Stratigraphic mixing of components and questionable association at Engigstciak has led many to dismiss or ignore these artifacts as DFC. The similarity in organic tool form from Matcharak Lake strengthens the likelihood that these organic tools are indeed Denbigh.

Another important DFC site with preserved organic tools is Trail Creek Caves (Larsen 1968). Like Engistciak, the stratigraphic context contains mixed deposits and differentiation of DFC material from Choris or Norton artifacts remains problematic. The organic tools that are probably DFC in origin include antler and slotted bone “arrow points” and one unusual decorated slotted bone handle or arrow point (Larsen 1968:49). While lacking inset microblades, the slotted antler points provide some clues for a possible function of these blades within the composite toolkit.

A bone “rod” or point with a narrow longitudinal rectangular groove (Figure 14.3:b) was discovered by Irving (1962) in a caribou-bone midden associated with ASTt tools at Punyik Point. The finished antler tool is about “5½ inches [14 cm] long, with an oval cross section, and pointed at both ends; one end is slightly flattened” (Irving 1962:77). This bipointed tool is interpreted to be an arrow point. A similarly secure DFC context at Punyik Point also yielded an eyed needle of bone or antler.

A bird-bone needle-case lid with three incised lines was reported by Lobdell (1995:69) from the Central Creek Pingo site (XBP-008), which is a similar decorative motif as the foreshaft or handle described from Matcharak Lake. However, questions of association loom over this piece as well.

Finally, the type site Iyatayet also has a small number of organic Denbigh artifacts (Giddings 1964). One of these, a sewn birch-bark sample, was recently dated by AMS (Beta-319843) to 3300 ± 40 BP (1684–1498 cal B.C.). The birch bark is distinctive in that one edge is cut straight just past a line of widely spaced pairs of small holes, which give it the appearance of being part of a lashed or sewn vessel. It is unclear how Giddings (1964:137) differentiated organic tools of Norton tradition from any that were possibly Denbigh, as he notes Denbigh artifacts were mixed into the Norton levels. While unconfirmed, one barbed “harpoon” dart head of antler was recovered “below the Norton levels” at Iyatayet (Giddings 1964:143); if DFC associated, it would suggest Denbigh people possessed nontoggling-harpoon technology. The pointed base, square notched hafting element and bilateral barbs very much resemble harpoon forms from Level 4 at Margaret Bay (Knecht et al. 2001), suggesting Aleutian influence.

SITE TYPES AND SETTLEMENT PATTERNS

Site Types

Clear examples of Denbigh Flint Complex sites occur across all of northern Alaska and Yukon Territory, from Norton Sound and the Seward Peninsula in the west, north and east along the Beaufort Sea coast to the Mackenzie River delta and south into the Brooks Range (Figure 14.1). Denbigh sites south of the Brooks Range divide are rare. (As mentioned above, we are following the convention of others by separating the DFC from the Brooks River Gravel Phase and other related ASTt groups in Southwest Alaska). Eighty-three percent ($n = 124$) of Denbigh sites are found in an inland setting, while 17 percent ($n = 24$) are

found on the coast. If we consider the 46 separate localities found at Cape Krusenstern as individual sites (Giddings and Anderson 1986), the proportion of coastal occupations rises to 35 percent. Undoubtedly, some inland sites such as Onion Portage and Punyik Point represent multiple occupations over the course of many centuries, which are not always visible as discrete localities since the occupations focused on repeated use of a single location.

Considerable variation in site activities or site types is evident among the known sample of Denbigh sites. Most sites are small scatters of lithic artifacts found in surface contexts and located in exposed settings that provide views of the surrounding landscape. These sites represent ephemeral occupations used for spotting game and indicate a large component of logistical mobility was incorporated in Denbigh land use. Local environmental settings for inland sites include 43 (29 percent) located adjacent to a lake, 47 (32 percent) by a creek or river, 33 (22 percent) on an overlook, and 1 (1 percent) in a cave (Figure 14.4). Housing features, hearths, and other constructed facilities are generally rare in Denbigh sites, but where present are taken to indicate the presence of a camp. Few Denbigh sites have been broadly excavated, but those that have indicate most camps were small, occupied for brief intervals, and were infrequently reoccupied. A few notable exceptions to this general pattern, however, include Onion Portage and a number of lakeside sites, including Punyik Point (Irving 1964; Kunz 2005), Kurupa Lake (Schoenberg 1985), Kuzitrin Lake (Harritt 1998), Tukuto Lake (Gerlach and Hall 1988), and Matcharak Lake (Tremayne 2011).

While winters appear to have been spent in the interior hunting caribou, spring and summer sealing camps are reported from Bering and Chukchi Sea coasts (Giddings and Anderson 1986). These sites generally have three to six hearth rings with a small amount of lithic debris and fire-cracked rock (FCR) nearby. At least 46 hearths, representing

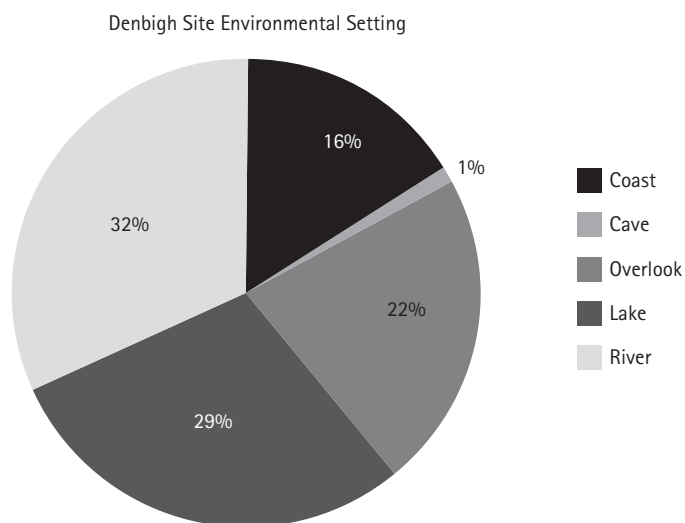


FIGURE 14.4 Distribution of Denbigh sites by environmental setting.

Produced by A. Tremayne

dozens of occupations over many centuries, are known from the well-studied Cape Krusenstern sites (Giddings and Anderson 1986). Similar coastal occupations are known from Cape Espenberg (Tremayne 2015), Lopp Lagoon (Giddings and Anderson 1986), and Safety Sound (Bockstoce 1979). Iyatayet is interpreted in the same way, although multiple occupations are found atop each other due to limited camping space on the landform (Giddings 1964).

Housing and Camp Functions

People of the DFC, as with other complexes of the ASTt, used skin tents for shelter. Evidence in the form of tent rings associated with ASTt artifacts are found across arctic North America (Dyke and Savelle 2009; Odess 2003). In Alaska, only a handful of possible DFC tent rings have been reported (Hall 1975; Harritt 1998; Odess 2003; Tremayne 2011). Based on the limited sample, Denbigh tent rings measure about 3–4 meters in size, are oval to subrectangular in shape, and may have an associated hearth nearby. Odess (2003:17) describes a tent ring found along a tributary of the Noatak with preserved evidence of an “axial” or “mid-passage” structure, which is the “hallmark of the ASTt” in the eastern Arctic. Maschner et al. (2010) excavated a box hearth in southwest Alaska, which was argued as evidence for cultural transmission between people there to other parts of the Arctic, though no Denbigh sites in northwest Alaska have clearly revealed such features.

In the ethnohistoric period in Alaska, skin tents were most commonly summer houses, while semisubterranean sod- or earth-covered houses were used in winter, but it is uncertain how far back in time this pattern can be projected. ASTt people of the Independence I culture in Greenland spent winters above 70° N latitude in skin tents (McGhee 1996). Thus it is possible Denbigh used tents for winter houses, as well. Clusters of FCR, interpreted as hearth features, are noted from a number of DFC sites, and are presumed to be the only house remains of temporary skin tent camps, yet season of occupation remains undetermined in most cases. Storage features, such as cache pits, have not been reported supporting a hypothesis that camps were for short-term occupations.

As mentioned, semisubterranean (winter) houses are known from three Denbigh sites in northern Alaska. The best evidence for Denbigh winter houses comes from Onion Portage and Punyik Point (Anderson 1988; Irving 1964). Anderson (1988) reported six Denbigh houses, which are circular depressions 3–4 meters in diameter, excavated no deeper than 50 cm, and include central hearths. Another house at Onion Portage originally assigned to a “proto-Denbigh” phase, but subsequently dated to the “classic” Denbigh period (Meitl 2008), is slightly larger at 4 meters wide and roughly rectangular in shape. A single DFC house feature (H-54B) at Punyik Point was reported by Irving (1964). Unfortunately, this feature was disturbed by later occupations so the entire form could not be recorded (Irving 1964:298). Although poorly preserved, the house provides one important detail about Denbigh house design—an excavated entrance tunnel. This marks the earliest evidence for a cold trap for arctic winter houses, a feature that was to become a hallmark of high latitude housing design for the next 4,000 years. Multiple house forms seem

to occur during this period as no tunnels are present among the several well-preserved house features at Onion Portage. At KIR-124 at Kurupa Lake another semisubterranean house is reported, although the shape of this feature was not well delineated as only half of the house was excavated (Schoenberg 1985). A better record of ASTt semisubterranean houses are known from southwest Alaska, but the sample is still limited (Dumond 2005).

Settlement Patterns

Giddings and Anderson (1986) employ ethnographic analogy to interpret the Denbigh settlement system and seasonal round. In their view, Denbigh people were the first in northern Alaska to develop a dual economy based on terrestrial and maritime resources. As such, their seasonal round cycled from fall to winter habitation in the interior, where the residents subsisted primarily on caribou and freshwater fish, to short-term spring to summer coastal camps, where seals were the primary focus. Empirical archaeological evidence for this settlement pattern is derived from the interpretations of house forms. As mentioned above, semisubterranean houses are considered winter dwellings, and they are found only in interior contexts and completely lacking from coastal settings (Anderson 2005; Dumond 1982; Giddings and Anderson 1986). Seals are targeted best in the spring and early summer, while late summer fish runs and fall caribou migrations would have been an attractive pull into the interior during the colder seasons of the year. This seasonal mobility pattern was practiced by select ethnographically known Inupiat groups in the Kobuk and Noatak region of northwestern Alaska (Burch 1975), an area with a high concentration of Denbigh sites. It is likely some Denbigh groups were year-round residents in the mountains, surviving by intercepting caribou migrating through the passes of the Brooks Range. Tremayne (2011) documents the presence of fetal caribou bone, an early spring indicator, from Matcharak Lake in the upper Noatak, leaving scant time to travel to the coast for seal hunting and then return in time for the fall caribou migration. Most researchers agree the interior was the ecological setting in which Denbigh people spent most of their time and that coastal resources and adaptations were secondary and in a developmental stage (Ackerman 1998; Dumond 1982; Giddings 1964), but evidence is building that the coast played a larger role in the Denbigh settlement and economy than is often permitted (Tremayne 2015).

SUMMARY

Recent discoveries and research in the last few decades have provided important new empirical data to build on existing models for Denbigh settlement patterns, subsistence practices, social organization and colonization processes. By 4,000 years ago, the Denbigh population size began to increase, the Brooks Range had been extensively explored, and trade networks were in place from western Alaska into Canada. Additionally, the movement of obsidian across the Bering Strait shows contact with Asia

was likely continuous from Denbigh times on. The cause of the ASTt/DFC decline in Alaska is still poorly understood. VanderHoek (2008) presents a strong case that about 3600 cal. B.P., a catastrophic volcanic eruption on the Alaska Peninsula ejected a massive plume of ash to the north, causing a widespread caribou population crash resulting in the eventual disappearance of the ASTt in Alaska by about 3,300 years ago.

Denbigh people are rightly considered highly mobile as their sites generally appear as ephemeral short-term camps likely occupied by a small band of foragers, perhaps two or three families. They were likely socially organized into small egalitarian kin-based bands (Dumond 2001). Their seasonal round shows definite camp placement in areas where caribou migrate through the Brooks Range in vast numbers. However, they were adept at exploiting all the available prey in the area in seasons when caribou were rare (Tremayne 2011). Their toolkit appears geared toward exploitation of these large terrestrial mammals and designed to maximize utility and portability (Kuhn 1994). At least some Denbigh people maintained a connection to the coast and traveled there in the spring or summer months to exploit seals (Giddings and Anderson 1986). It is still unclear when and how Denbigh people developed maritime adaptations, whether in Siberia before migrating across the Bering Strait, through contact with contemporary populations in southwest Alaska, or through independent invention. Work needs to be done to understand the origins of the DFC, the development of specialized subsistence systems, and their relationship to later groups that supplant them. Further investigation on the Siberian side would go a long way toward answering many of these questions.

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CHAPTER 15

THE ENIGMATIC CHORIS AND OLD WHALING CULTURES OF THE WESTERN ARCTIC

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INTRODUCTION

CHORIS and Old Whaling are terms ascribed by J. Louis Giddings (1957, 1961, 1964, 1967) to two archaeological cultures or phases of his culture-historical reconstruction of the prehistory of Kotzebue Sound. Both phases denote significant—but poorly understood—instances of change in the archaeological record from the previous Denbigh Flint complex (DFC) (4300 to 3300 B.C. [see Tremayne and Rasic, this volume, chapter 14] though possibly as late as 500 B.C. [Slaughter 2005]). The Old Whaling component follows DFC first in the sequence, spanning a time between 1150 and 850 B.C., and then the Choris phase shortly afterwards, between 750 and 400 B.C. An enigma surrounds both cultures that is a product of rarity: Choris is known definitively from only three locations, and Old Whaling from but one (Anderson 1988; Darwent and Darwent 2005; Giddings and Anderson 1986). And in the absence of evidence comes speculation.

This chapter explores both the Choris and Old Whaling archaeological cultures, their chronology and geographic distribution, associated artifacts, subsistence economy, and how they fit into the wider picture of western arctic culture history. We take the view that Choris represents an archaeological phase, using Willey and Phillips's (1958:22) sense of the term, in the culture-historical sequence of Kotzebue Sound and adjacent drainages. Others see Choris as a much broader archaeological unit that encompasses a wider geographic area from the eastern Aleutian Islands to the Mackenzie Delta (e.g., Laughlin 1962; Maschner 2008; Mason and Gerlach 1995) or as the perpetuation of the longer-lived Arctic Small Tool tradition (ASTt) already in place in northwestern Alaska

(Anderson 1984), whereas others see Choris as epiphenomenal of the Norton tradition (Dumond 2000). While these positions have merits (discussed below), we adhere to Choris as a phase because we believe that it is more in line with the original definition proposed by Giddings (1957, 1961:156) and better fits the evidence we currently have from the archaeological record for when it occurred.

Old Whaling presents a different challenge to culture-history taxonomy. There has been considerable speculation as to the origin and defining characteristics of Old Whaling (e.g., Ackerman 1998; Darwent and Darwent 2005; Dumond 2000; Giddings and Anderson 1986; Mason and Gerlach 1995), but at the end of the day, the Old Whaling locality remains a unique occurrence in time and space. Therefore, to fit it into a culture-historical framework, Old Whaling must be considered a “component” at best.

CHORIS

The original type site of the Choris phase was discovered by Giddings (1957) on the Choris Peninsula in 1956. Here, on an interior terrace, he discovered three large “serving-dish”-shaped depressions approximately 45 m apart parallel to the old shoreline. Subsequent excavations revealed they were the remnants of ovoid structures or houses that likely had an inner configuration of two parallel lines of poles that held up some sort of structure (Giddings 1967:202). The largest of the structures was almost 12 m long, with the other two being 10 m and 8 m. Giddings estimated that the 10 m house (which was ~4.5 m wide) could have easily held 30 people. Only one structure had a clearly defined hearth, but another had a charred area with an associated lamp. Based on size and regular house spacing, Giddings (1967:215) conjectured that the site was a village of sorts, possibly inhabited by reindeer-herding pastoralists using communal houses; however, this latter interpretation was later dropped (Giddings and Anderson 1986). In addition, three midden areas were identified on younger beach ridges in front of the houses (Giddings and Anderson 1986:222).

CHORIS-PHASE SITES

Later investigation by Giddings (Giddings and Anderson 1986) on beach ridges 44–48, and 52 at Cape Krusenstern revealed “Choris” campsites with 77 features documented across these ridges. However, none of these features has been directly radiocarbon dated, and many cannot be assigned to a particular archaeological culture because no diagnostic artifacts were recovered. Several other features were more recent than either Choris or Norton ($n = 4$), which underscores that older beach ridges were reused by later occupants. Sherds of cord-marked or linear-stamped pottery were recovered from seven features across beaches 44, 46–48, and check-stamped potsherds were recovered

from a single feature on beach 44. Formed lithic artifacts from these beaches appeared to be related to the ASTt—oblanceolate and straight-stemmed bifacial points, akin to those found at the Choris type site, were recovered from a large tool cache.

Two bands of deposition at the deeply stratified Onion Portage site (Anderson 1988)—Band 2/3 and Band 3—have lithic artifacts stylistically similar to the Choris type site, pottery, and radiocarbon dates that place them in the same time period. While Anderson (1988) posits that these layers represent 800 years of Choris occupation, after examining the radiocarbon evidence (Table 15.1; Figure 15.1), this interval was likely much shorter. In addition to artifacts, several hearth areas were noted and a dwelling structure. This latter house, although oval in shape, differs considerably from the coastal houses; it is considerably smaller in size, lacks post molds, and has a well-defined entrance tunnel (Anderson 1988:111). Based on the artifact associations and dates, we cannot conclude any differently than Anderson (1988) that this is another form of Choris-phase house.

As of 2012, based on government site records, a total of 56 sites have been ascribed to Choris in Alaska and Canada: 49 from Alaska, six from the Yukon, and one from the western Northwest Territories. However, most of these sites are surface scatters or designated from small-scale test excavations, and thus have little in the way of artifacts, features, or radiocarbon dates on which to base Choris associations. Thus the above-mentioned Choris type site, Cape Krusenstern (specifically the beach ridges *after* Ridge 53 and *none* prior to it; see also Mason and Ludwig 1990), and Onion Portage (levels B2/3, B3), which are in northwestern Alaska and within the Kobuk River–Kotzebue Sound region, are the only sites that can be considered clearly Choris—because these sites have three or more characteristics that are clearly diagnostic of the Choris phase. Five additional sites—KTZ-079, KTZ-098 (Schaaf 1988), KTZ-125 (Harritt 1994; Schaaf 1988), Anaqpaq (PSM-056) (Gal 1982), and Satkualuk (NiTs-4) (Sutherland 2006)—are contenders for Choris affiliation, as they have two defining characteristics. The latter site (Satkualuk) would be the most easterly Choris manifestation, but the associated radiocarbon date suggests it is most likely part of the wider Norton tradition. One additional site—Trail Creek Cave (Larsen 1968)—is often mentioned in conjunction with Choris because of bifaces with Choris-style flaking patterns (see Giddings 1967). While there may have been a Choris-phase occupation at this cave, the stratigraphy of the cave was profoundly mixed and the two radiocarbon dates are likely too early to be associated with the Choris phase.

The low occurrence of Choris-phase sites has been used by Mason and Gerlach (1995) to reason that during this time there was an exceptionally low population in the Kotzebue Sound region. While this conjecture may have some veracity, it is also possible that the low number of Choris-phase sites is due to the low frequency of archaeological research in the area since Giddings's work ended in the 1960s and Andersons in the 1970s—that is, projects interested in identifying and studying Choris-aged sites (see Anderson and Freeburg 2013; Harritt 1994; Schaff 1988 for exceptions). It is also possible that many Choris-phase sites have been destroyed; Mason and Jordan (1993) indicate that between 1300 B.C. and A.D. 300 widespread coastal erosion likely truncated many

Table 15.1 Radiocarbon Dates from Alaskan and Canadian Sites Reported to be Affiliated with the Choris Archaeological Culture

Site Name	Lab #	Material	$\delta^{13}\text{C}$	^{14}C Age	2 σ Calibrated Age*	Reference
Satkualuk (NiTs-4): buried (40–45cm)	Beta-77809	caribou (?) bone collagen	–21.1	2230 $\pm$ 60	401–119 cal b.c.	Sutherland 2005
Walakpa/Coffin (BAR-014)	GaK-2299	charcoal	?	3400 $\pm$ 520	—	Stanford 1976
Walakpa/Coffin (BAR-014)	GaK-2300	burned organic matter	?	2260 $\pm$ 300	—	Gal 1982
Anaqpaq (PSM-056)	GX-4070	charcoal	?	2305 $\pm$ 135	770–55 cal b.c.	Gal 1982
Anaqpaq (PSM-056)	GX-4249	charcoal	?	2360 $\pm$ 75	761–210 cal b.c.	Gal 1982
Onion Portage: B-2/3	P-1066	charcoal	–25 e	2370 $\pm$ 50	750–365 cal b.c.	Anderson 1988
Onion Portage: B-3, L-1 (Top)	P-1067	charcoal	–25 e	2430 $\pm$ 50	755–401 cal b.c.	Anderson 1988
Onion Portage: B-3, L-1 (Top)	K-832	charcoal	–25 e	2750 $\pm$ 140	1368–538 cal b.c.	Anderson 1988
Onion Portage: B-3, L-2	P-591a	charcoal	–25 e	2450 $\pm$ 60	763–405 cal b.c.	Anderson 1988
Onion Portage: B-3, L-2	GX-1504	charcoal	?	2450 $\pm$ 85	782–399 cal b.c.	Anderson 1988
Onion Portage: B-3, L-2	K-835	charcoal	–25 e	3170 $\pm$ 120	1739–1120 cal b.c.	Anderson 1988
Onion Portage: B-3, L-5	GX-1505	charcoal	?	2780 $\pm$ 100	1257–790 cal b.c.	Anderson 1988
Choris: Area 3 (SLK-007)	P-611	charcoal	–25 e	2190 $\pm$ 51	387–11 cal b.c.	Stuckenrath et al. 1966
Choris: House 1 (SLK-007)	P-175	caribou antler fragments	–20 e	2324 $\pm$ 133	785–96 cal b.c.	Ralph and Ackerman 1961
Choris: House 1 (SLK-007)	AA-83632	caribou humerus collagen	–19.7	2416 $\pm$ 46	753–397 cal b.c.	this volume

Choris: House 1 (SLK-007)	AA-83631	caribou tibia collagen	−20.1	2461 ± 49	762–410 cal b.c.	this volume
Choris: House 1 (SLK-007)	P-96	architectural wood	−25 e	2635 ± 125	1054–405 cal b.c.	Ralph and Ackerman 1961
Choris: House 2 (SLK-007)	AA-83633	caribou mandible collagen	−19.7	2444 ± 42	755–406 cal b.c.	this volume
Choris: House 2 (SLK-007)	AA-83634	caribou ulna collagen	−20.4	2460 ± 55	764–409 cal b.c.	this volume
Choris: House 2 (SLK-007)	P-203	charcoal	−25 e	2646 ± 177	1266–385 cal b.c.	Ralph and Ackerman 1961
Choris: House 3 (SLK-007)	AA-88114	caribou scapula collagen	−20.3	2393 ± 45	749–389 cal b.c.	this volume
Cape Espenberg (KTZ-079)	Beta-17962	charcoal	?	2340 ± 80	754–204 cal b.c.	Schaaf 1988
Cape Espenberg (KTZ-079)	Beta-17961	charcoal (oil-soaked)	?	2660 ± 110	—	Schaaf 1988
Cape Espenberg (KTZ-098)	Beta-17966	charcoal	?	2500 ± 90	799–407 cal b.c.	Schaaf 1988
Cape Espenberg (KTZ-127)	Beta-33760	charcoal	?	2530 ± 130	971–375 cal b.c.	Harritt 1994; Schaaf 1988
Cape Espenberg (KTZ-127)	Beta-33759	charcoal	?	2790 ± 80	1192–802 cal b.c.	Harritt 1994; Schaaf 1988
Trail Creek: Cave 2 (BEN-001)	K-983	caribou antler collagen	−20 e	2780±110	1291–770 cal b.c.	Larsen 1968
Trail Creek: Cave 2 (BEN-001)	K-979	caribou bone collagen	−20 e	2890±110	1381–835 cal b.c.	Larsen 1968

* Reimer et al. 2009

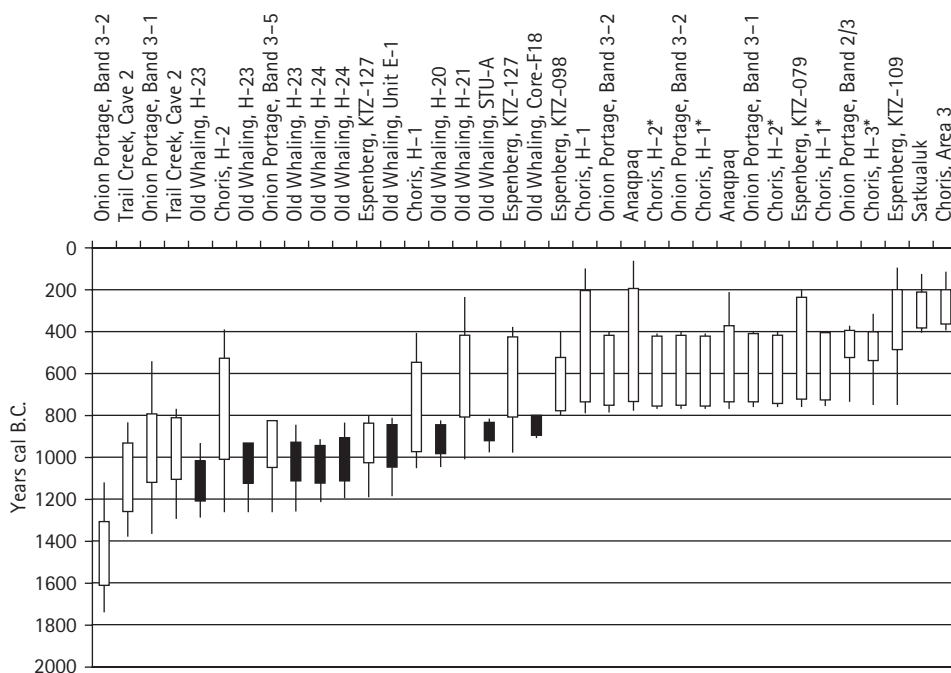


FIGURE 15.1 Compilation of radiocarbon dates from various Choris-phase occupations in the western Arctic and the Old Whaling site, with 1σ (box) and 2σ (line) calibrated ranges. Previously unpublished radiocarbon dates from the Choris type site are marked with an asterisk. Illustration prepared by Christyann M. Darwent.

beach sequences in the area. Thus it is difficult to determine populations of people during the Choris phase from the current evidence at hand.

CHORIS-PHASE DATES

Thirty radiocarbon dates are available for Choris or possibly Choris sites, of which 26 do not appear contaminated with sea-mammal oil or have exceptionally large standard deviations (Table 15.1; Figure 15.1). Of key interest here are eight samples from the Choris type-site houses that come from undoubtedly Choris contexts. Three of the eight dates were derived using conventional radiocarbon-dating methods (Ralph and Ackerman 1961) and thus have large standard deviations that limit their usefulness. The oldest Choris date, which comes from Band 3, Level 2, at Onion Portage, is highly suspect because other dates taken from the same level or lower levels are considerably younger. Five dates were obtained recently for the Choris type site using AMS dating of caribou-bone collagen, all of which fall within 750–400 cal B.C. (Table 15.1; Figure 15.1). Based on the congruity of these dates, and their presence in three different houses

at the Choris type site, we believe that any date prior to 800 B.C. is probably too early to ascribe to the Choris phase. Of note, these dates are clearly after the Old Whaling component (Table 15.2; Figure 15.1).

CHORIS-PHASE ARTIFACTS AND FAUNA

Lithics

The lithic technology used during the Choris phase is likely a continuation of that used during the DFC—in other words, following Anderson (1984), it is derived from the ASTt. This statement does not dictate that the same group of people as the DFC made Choris-phase tools; rather, the same technological tradition was present. The similarities between DFC and Choris reside with the flaking patterns, projectile-point forms, and flake-knife forms (Anderson 1984, 1988; Giddings and Anderson 1986), though it should be noted that there is disagreement with this assessment (Dumond 2000). In terms of stone tools, it is actually easier to determine what is not associated with the Choris phase than what is associated, which unfortunately leads to a lack of “positive” diagnostics for the Choris phase.

One of the most discussed features of the DFC is the parallel, oblique flaking, sometimes referred to as diagonal flaking, used to finish bifacial endblades and some knives (Giddings 1951, 1964, 1967). This flaking pattern continued into the Choris phase, and possibly reached its pinnacle of application during this time (Figure 15.2). Anderson (1984) purports that there was greater use of this method in the Choris-phase inventory and was applied to larger specimens than during the DFC. This flaking pattern wanes with the later Norton tradition, when the final flaking of tools becomes parallel or random in orientation, but it is still present on some specimens. Therefore, because this flaking pattern is found in all three phases, there are no grounds to use this attribute alone as diagnostic of the Choris phase (but does speak to a continuum in the lithic tradition).

Although there are some trends in the shapes of Choris projectile points, almost all have some precedence in the DFC or carry on to the Norton tradition. The most common type of projectile point or endblade equated with the Choris phase is a stemmed form (Figure 15.2). Although it does not appear that stemmed points were common during the DFC, there are instances (e.g., Giddings 1951:Figure 60b-1). The trend in the Choris phase is for some stemmed-point forms to become more shouldered, but these forms (usually minus the parallel flaking) continue into the Norton phase (Giddings 1964:Plate 49). As a consequence, stemmed projectile points on their own, without other forms of chronologically sensitive artifacts, should not be taken as solely Choris in origin. Another form that carries on from the DFC to the Choris phase and subsequently into the Norton period is concave-base harpoon projectile points, and thus it is similarly nondiagnostic. However, one projectile-point form that does not seem to be present in

Table 15.2 Radiocarbon Dates from the Old Whaling component at Cape Krusenstern National Monument (NOA-002), Alaska

Feature	Lab #	Material	$\delta^{13}\text{C}$	^{14}C Age	2 σ Calibrated Age*	Reference
House 21	B-267a	charcoal	-25 e	2470 $\pm$ 150	908-203 cal b.c.	Gfeller et al. 1961
House 21	B-267b	wood	-25 e	2530 $\pm$ 150	1005-232 cal b.c.	Gfeller et al. 1961
Core F18 (H-204)	Beta-193490	wood charcoal	-25.2	2670 $\pm$ 40	902-794 cal b.c.	Darwent and Darwent 2005
STU-A (H-21/23)	Beta-187947	wood charcoal	-25.2	2740 $\pm$ 40	976-810 cal b.c.	Darwent and Darwent 2005
House 20: wall post	P-627	architectural wood	?	2775 $\pm$ 50	1042-817 cal b.c.	Giddings and Anderson 1986
Unit E-1 (H-204)	Beta-187946	wood charcoal	-25.2	2800 $\pm$ 70	1188-810 cal b.c.	Darwent and Darwent 2005
House 23: wall post	P-403	architectural wood	-25 e	2850 $\pm$ 63	1252-845 cal b.c.	Stuckenrath et al. 1966
House 23: wall post	P-621	architectural wood	-25 e	2859 $\pm$ 63	1258-850 cal b.c.	Stuckenrath et al. 1966
House 24: wall post	P-404	architectural wood	-25 e	2829 $\pm$ 63	1193-834 cal b.c.	Stuckenrath et al. 1966
House 24: wall post	P-618	architectural wood	-25 e	2865 $\pm$ 49	1209-910 cal b.c.	Stuckenrath et al. 1966
House 23: wall post	P-615a	architectural wood	-25 e	2907 $\pm$ 55	1286-929 cal b.c.	Stuckenrath et al. 1966
House 24: hearth	P-617	charcoal and wood	-25 e	2989 $\pm$ 50	—	Stuckenrath et al. 1966
House 204: lodge 4, hearth	P-616	charcoal	-25 e	2998 $\pm$ 62	—	Stuckenrath et al. 1966
House 205: lodge 5, hearth	P-619	charcoal	-25 e	3024 $\pm$ 51	—	Stuckenrath et al. 1966
House 21: hearth	P-402	charcoal and wood	-25 e	3084 $\pm$ 63	—	Stuckenrath et al. 1966
House 23: hearth	P-623a	charcoal	-25 e	3291 $\pm$ 65	—	Stuckenrath et al. 1966
House 24: hearth	P-624	charcoal	-25 e	3571 $\pm$ 66	—	Stuckenrath et al. 1966
House 22: hearth	P-405	charcoal	-25 e	3583 $\pm$ 65	—	Stuckenrath et al. 1966
House 23: hearth	P-401	charcoal	-25 e	3630 $\pm$ 53	—	Stuckenrath et al. 1966
House 22: hearth	P-626	charcoal	-25 e	3647 $\pm$ 53	—	Stuckenrath et al. 1966
House 24: hearth	P-614	charcoal	?	3655 $\pm$ 58	—	Giddings and Anderson 1986
House 24: hearth	P-400	charcoal	-25 e	3678 $\pm$ 53	—	Stuckenrath et al. 1966

* Reimer et al. 2009

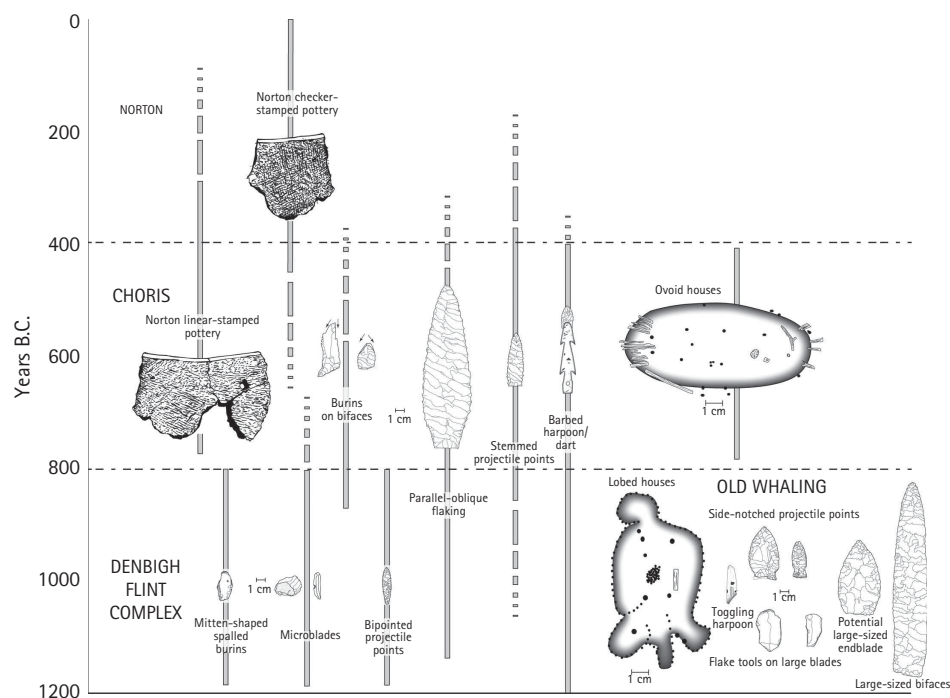


FIGURE 15.2 Representative artifacts and house styles associated with the Choris phase and Old Whaling component in the western Arctic. Illustrated and prepared by John Darwent.

Choris is finely flaked bipointed endblades or projectile points, which seem to be associated only with the DFC.

Lithic technologies that disappear immediately before or early very during the Choris phase are interesting from an economic standpoint. The first and foremost of these is microblade technology. Although a hallmark of the DFC, microblades and their cores are generally absent from unequivocally Choris-phase sites (Anderson 1984, 1988; Giddings 1957; Giddings and Anderson 1986). Also dwindling during the Choris phase was the use of “mitten-shaped” spalled burins. The use of spalled burins and burin spalls did continue during the Choris phase (Giddings 1957); however, most of the burins seem to be recycling efforts rather than being intentionally made to serve as burins. Choris-phase burins were made on broken bifaces, cores, and irregular retouched flakes, which all appear to have had little in the way of preparation to modify them into burins unlike mitten-shaped burins. Some of the best examples of this process were recovered from Trail Creek, where large parallel and parallel oblique flaked bifaces have been converted into burins (Larson 1968). This form of burins has been considered diagnostic of the Choris phase by some investigators (e.g., Gal 1982; Gerlach and Hall 1988; Sutherland 2006); however, a similar biface-based burin was recovered from late DFC layers at Onion Portage (Anderson 1988:97), and thus caution is necessary when using these burin forms as a Choris-phase diagnostic.

Pottery

One of the largest milestones that occurred in terms of artifact development in northwestern Alaska during the Choris phase was the introduction of pottery. Its origin undoubtedly was Siberian, likely from the Bel'kachinsk or Ymyyakhtakh cultures who manufactured paddle-impressed linear and check-stamped pottery respectively (see Hoffecker 2005). There is no evidence of an indigenous origin for pottery in north Alaska region, and pottery is one of the key characteristics present in the Choris phase that is not a component of the DFC (or present at the Old Whaling locality).

The first work undertaken on Choris-phase ceramics was by Griffin (1953), the results of which were expanded on in Oswalt (1955) and Griffin and Wilmeth (1964). It should be pointed out that early work on the ceramics had occurred *before* the Choris type site was discovered. The ceramics associated with the Choris phase are part of what Griffin (1953) called Norton Ware, with Norton linear-stamped being the earliest of three forms of the ware. This pottery type was primarily fiber (organic) tempered, coarse textured, 4–12 mm in body-sherd thickness (7.2 mm mean), and colored black to gray, with tans, reds, browns, and reddish browns present as well (Griffin and Wilmeth 1964:273). The surface of this pottery was stamped over the whole vessel from lip to base, with lines approximately 1 mm apart running vertical to oblique from the rim.

While this pottery type is associated with the Choris phase, it also characteristic of the Norton tradition later in time (Giddings 1964; Griffin and Wilmeth 1964)—especially considering it was defined as Norton pottery before the discovery of the Choris type site. *Therefore it cannot be used as the sole diagnostic for the Choris phase* (contra Gal 1982; Hall 1982; Schaaf 1988). Instead, it is diagnostic of a pottery *tradition* that stretches from the Mackenzie Delta to the Alaska Peninsula that existed between 800 B.C. and A.D. 1000. From a footnote by Giddings (1964:281), it is also possible that some Norton checked-stamped pottery might be associated with Choris as well, which further complicates the use of pottery and pottery design to defined phases in northwestern Alaska.

Organic Artifacts

Poor preservation of organic artifacts, which typically yield more stylistic (design) information and are often used as temporal and/or “cultural” markers in coastal arctic sites, has hampered comparison of the Choris type site, with its relatively exceptional preservation, to others. Harpoon heads recovered from Choris Peninsula are bilaterally barbed dart varieties (nontoggling), with a central line hole and made of both ivory and antler, sometimes inset with an endblade (Figure 15.2; Giddings and Anderson 1986:Plates 109, 110). Harpoons or darts are lacking from early ASTt/DFC sites in Alaska (e.g., Giddings 1964), but similar types have been documented from the Cook Inlet, eastern Aleutians, Kodiak Island, and the Alaska Peninsula region dating to

~1000 B.C. (e.g., De Laguna 1934; Laughlin 1962; McCartney 1984), as well as from early Saqqaq (~2000 B.C.) deposits in West Greenland (e.g., Grønnow 1996) and early Pre-Dorset (~1850 B.C.) deposits at Icebreaker Beach on Devon Island (Helmer 1991:305–308). The only other northwestern arctic site where a possible “Choris-like” harpoon is reported is Engigstciak on the Yukon’s Firth River (MacNeish 1956; Sutherland 2006). In contrast, harpoons from sites ascribed to Norton are a single-spur toggling variety (Giddings 1964; Dumond 2000, this volume, chapter 16). Finds that include a similar style of toggling harpoon, linear and checked-stamped pottery, and slate from lower beach levels at Choris Peninsula, referred to as “Area 3,” may be a later manifestation of Choris (Giddings and Anderson 1986:222–225) or, given that the single associated charcoal date has the youngest mean age of all “Choris” dates (Figure 15.1), perhaps this late occupation is affiliated with the Norton tradition. Other organic hunting implements include an antler fishhook shank (Giddings and Anderson 1986:224).

The Choris-site houses yielded numerous preserved organic artifacts, which have not been documented in any other site affiliated with “Choris” and are rare from similar time-period sites across the Arctic. These include the head and torso of a human face with grooving behind the face, which was the location either for a “parka-like” hood, if this was part of a doll, or to suspend the carving on a thong, if a pendant. The face appears to have horizontal tattoo lines extending from the chin (Giddings 1967:Figure 77c). Such anthropomorphic “doll-like” figures are virtually unknown from well-preserved ASTt sites in the eastern Arctic (cf. Helmer 1986:188), but have been documented in the lower Alaska Peninsula and Aleutian region (see McCartney 1984; Maschner 2008). Given its distinctive stylistic attributes, it is quite likely that there is some form of southern connection with the Choris phase. Other organic Choris-phase finds include an ivory labret (which may also indicate a southern link [Mason and Gerlach 1995]), needles with round eye-holes, pendants, carved “ornamental” objects, and a semilunar-shaped ivory object that appears to have served as “swivel” plate (Giddings and Anderson 1986:Plate 109g).

Faunal Remains

The faunal remains from the Choris type site provide one of the few direct means of assessing prehistoric subsistence, as bone is not preserved in other Choris-related sites. At the Choris site, bones were recovered by shovel from the house structures and hand-picked without the use of sifting screens, which has produced an inherent bias toward larger species and larger skeletal elements. Initial analysis of the animal-bone remains from Choris Peninsula was part of an honors thesis project that concluded: “They [the Choris-site occupants] had eaten many a meal here, feasting upon caribou as liberally as upon seal” (Giddings 1967). Expanding upon this simple assessment, reexamination of the fauna from the Choris site reveals that both caribou and small seal were relatively as important as each other, but also the occupants of the Choris site were fully adapted to marine environments as evidence for beluga hunting is present.

Over 4,500 faunal specimens were reexamined (presented in Table 15.3). Fish remains were documented in the original analysis (Giddings and Anderson 1986:228) but were not relocated. Fifteen different taxa were identified, but less than 1 percent is bird. Although sampling may explain the small number of birds, these large semi-subterranean dwellings were most likely winter houses abandoned in favor of more mobile tent structures during the summer months. Dog remains were present, albeit in low frequency (1.5 percent); there is, however, no evidence that they were used for sled traction.

As with most coastal arctic sites, small seals constitute a large portion of the faunal assemblage at Choris, and all are likely ringed seal, based on mandible and cranial morphology. The number of identified specimens (NISP) demonstrates small seals make up over 42 percent of the faunal assemblage, and minimum number of individuals (MNI) indicates (based on auditory bullae and mandibles) they are nearly 35 percent of the assemblage. The only other seal species identified from this assemblage is bearded seal.

Caribou is the first-ranked animal in NISP (48 percent) and the second in MNI (33 percent). Spiral fractures (64 percent) along with visible impact scars (1.6 percent) indicate that the past occupants extracted marrow from the limb bones. Skinning cut marks were noted on numerous caribou elements, and nearly 20 percent of the antler specimens were debris from tool production; both underscore the importance of caribou beyond simply a source of meat.

Giddings (1967) made several controversial claims about the use of caribou at the Choris site. First, he purported that the caribou scapula were “lightly engraved” and cracked on the wide surface of the blade by heat, which he attributed to scapula “divination” (Giddings 1967:212). However, close examination of each scapula did not reveal any engraving, parallel lines, or charring, and all damage was due to warping, cracking, and breakage related to natural taphonomic processes and/or heat from cooking. Second, Giddings (1967) alleged that the caribou from the Choris assemblage were smaller than modern Alaskan caribou (based on a sample of two modern skeletons) and attributed this size difference to early reindeer domestication. However, comparison of the maximum breadth of the distal humerus to other barren-ground caribou populations (Meldgaard 1986) shows that although the Choris specimens are statistically smaller, they fall well within the range of modern caribou. The Choris assemblage is either female-dominated (most likely) or the population was experiencing local nutritional stress.

Beluga whales were likely procured by the inhabitants of Choris Peninsula, as at least three individuals (MNI based on mandibles) were harvested near this site. These remains suggest that capture of beluga by either harpoons in open water or driving them into shallows around Eschscholtz Bay—a documented historical practice (Lucier and VanStone 1995)—likely extends back at least 3,000 years and provides indirect evidence for the use of watercraft. No evidence exists for or against the taking of larger whales such as bowhead.

Table 15.3 Faunal Remains Collected from "Choris" House (House 1–3) Depressions Excavated at Choris Peninsula in 1956 and 1958, and from Old Whaling House (House 201–203, 205, 22–24) Depressions at Cape Krusenstern Excavated between 1959 and 1961

Taxon	Choris				Old Whaling			
	NISP	% NISP	MNI	% MNI	NISP	% NISP	MNI	% MNI
Small duck	4	0.12	2	2.63	2	0.09	1	0.23
Large duck	2	0.06	1	1.32	—	—	—	—
Murre/Guillemot (<i>Uria/Cephus</i> sp.)	1	0.03	1	1.32	—	—	—	—
Bird	22	0.66	—	—	1	0.04	—	—
<i>Total birds</i>	<i>29</i>	<i>0.87</i>	<i>4</i>	<i>5.27</i>	<i>3</i>	<i>0.13</i>	<i>1</i>	<i>0.23</i>
Hare (<i>Lepus</i> sp.)	4	0.12	1	1.32	—	—	—	—
Lemming	4	0.12	1	1.32	—	—	—	—
Beaver (<i>Castor canadensis</i>)	2	0.06	1	1.32	—	—	—	—
Rodent	4	0.12	—	—	—	—	—	—
Lynx (cf. <i>Lynx</i> sp.)	3	0.09	1	1.32	—	—	—	—
Fox (<i>Vulpes</i> sp.)	1	0.03	1	1.32	2	0.04	1	0.23
Dog/wolf (<i>Canis</i> sp.)	51	1.53	6	7.89	2 ⁺	0.09	1	0.23
Ringed seal (<i>Pusa hispida</i>)	268	8.05	26	34.21	20	0.87	—	—
Small seal (<i>Phoca/Pusa</i> sp.)	1138	34.18	—	—	2262	98.26	39	88.64
Bearded seal (<i>Erignathus barbatus</i>)	30	0.90	5	6.58	—	—	—	—
Seal (pinniped)	98	2.94	—	—	—	—	—	—
Bear (<i>Ursus</i> sp.)	39	1.17	2	2.63	—	—	—	—
Caribou (<i>Rangifer tarandus</i>)	1608*	48.30	25	32.89	11	0.56	2	0.45
Large Artiodactyl	2	0.06	—	—	—	—	—	—
Beluga (<i>Delphinapterus leucas</i>)	5	0.15	3	3.95	—	—	—	—
Small whale	29	0.87	—	—	—	—	—	—
Whale (indeterminate)	14	0.42	—	—	1	0.04	—	—

(continued)

Table 15.3 Continued

Taxon	Choris				Old Whaling			
	NISP	% NISP	MNI	% MNI	NISP	% NISP	MNI	% MNI
<i>Total mammals</i>	3300	99.13	71	94.74	2298	99.87	43	97.73
Total NISP	3329	100.00	—	—	2301	100.00	—	—
Total MNI	—	—	76	100.00	—	—	44	100.00
N Taxa (richness)	—	—	15	—	—	—	6	—
Marine mammal	14				—			
Small terrestrial mammal	9				—			
Large terrestrial mammal	706				2			
Mammal (indeterminate)	486				4131			
<i>Total unidentified</i>	1215				4133			
Total vertebrates	4544				6434			

NISP = number of identified specimens; MNI = minimum number of individuals (see Lyman 2008)

* does not include 60 worked and unworked antler tine fragments

+ an unknown number of *Canis* sp. specimens from Old Whaling were taken to Copenhagen for identification by zoologist Ulrik Møhl in the mid-1960s, when Giddings was on a Fulbright fellowship (Anderson personal communication 2009).

Origins of the Choris Phase

Because we view Choris as an archaeological phase, which is a cultural-historical unit for defining blocks of time in a local region (Willey and Phillips 1958), we do not view Choris as an ethnically distinct group of people or culture but rather a historically unique *combination* of lineages of different technologies that coalesced at a point in time in the Kotzebue Sound region. Unfortunately, at this time there is no genetic, linguistic, or archaeological evidence that undeniably attests to population movements or strictly in situ development. On the one hand, similarities between Choris-phase lithic technology and that of the ASTt (Anderson 1984) suggest technological continuity in stone-tool manufacture. However, whether this technological continuity occurred in the Kotzebue Sound area or some other area either northward or southward and then backwashed into the region again is unknown. Others have challenged the connection entirely (Dumond 2000) and link Choris lithic technology to the south. On the other hand, there are technologies that clearly originated outside of the region, and pottery is the most salient of these.

As discussed, pottery in Alaska most likely had a Siberian origin (e.g., Hoffecker 2005), and because the Seward Peninsula is the closest landfall to a crossing of the

Bering Strait, it is likely that Kotzebue Sound was one of the first areas for pottery to disseminate. Pottery manufacturing is a skill that is not overly amenable to acquisition by simple copying or reengineering, and thus its appearance implies that people either moved to Alaska with pottery-making knowledge or were crossing the Bering Strait and attained such skills. Ackerman (1984) points out that on the Siberian side possibly as early as the DFC, and definitely at the same time as Norton, the Ust'Bel'skii complex on the Anadyr River, Chukotka, Siberia had a lithic assemblage very similar to the DFC (also burinated bifaces like Choris) and linear-stamped pottery very similar to Norton Ware. It is possible that the Choris phase represents a second intrusion of ASTt-like people—a scenario that would explain the similarities in lithic forms *and* the introduction of pottery (Hoffecker 2005). As others have noted, “late forms of the Siberian Ymyyakhtakh ceramic technology no doubt influenced Choris and Norton ceramics on the other side of the straight” (Fitzhugh and Crowell 1988:122).

There are, however, traits that appear in the Choris phase that do not seem to have either temporal or spatial antecedents. The most salient of these are the large ovoid houses that have no precursors in the archaeological record of either Alaska or Siberia. The presence of these houses firmly indicates that major social organization changes occurred from the previous DFC, which does not have recognizable dwellings other than tent rings (Odess 2003; Tremayne and Rasic, this volume, chapter 14). As mentioned, widespread coastal erosion of the Kotzebue Sound during the first millennium B.C. destroyed many of the beach-ridge sequences for the region (Mason and Jordan 1993); thus there may not be much evidence to investigate a local origin for the houses. However, there do not appear to be good matches outside the region either.

Others have presented a different view of what Choris represents in the archaeological record. Anderson (1984, 1988; Giddings and Anderson 1986) connects Choris culture directly to the ASTt and perceives it as a continuation of the tradition from Denbigh to Norton and then Ipiutak. In using the ASTt in such a manner, Anderson implies that ASTt is a much larger manifestation than simply a stone-tool making tradition, expanding considerably from Irving's (1964) original definition. Rather than being a rapid change from the DFC to Choris, Anderson (1984) sees the transition between the two “cultures” as a more gradual introduction of new technologies, such as pottery, houses, and burin forms, as well as the discontinuation of other tool forms such as microblades and mitten-shaped burins. If we are interpreting Anderson (1984) correctly, Choris culture is thus the result of the DFC settling in to northwestern Alaska. To lend support for this hypothesis, Anderson (1984:86) posits that Choris assemblages have more regionally varied tool types geared toward exploiting local resources compared to the relative ubiquity of artifact forms for both interior and coastal DFC assemblages (see Tremayne and Rasic this volume for description), which would be expected of a founder population.

In contrast, Mason and Gerlach (1995:3) view Choris in an almost “perpendicular” manner to Anderson's (1984) trajectory, evoking Willey and Phillips's (1958:33) definition of a horizon—“a primarily spatial continuity represented by cultural traits and assemblages whose nature and mode of occurrence permit the assumption of a broad

and rapid spread”—to explain Choris. In their scenario, Mason and Gerlach (1995:3, 23) conjecture that Choris spread quickly along the coast from the eastern Aleutians, as small founding populations, over to the Mackenzie Delta in western Canada and possibly into the interior. As proof, they cite the presence of labrets and similarities between the barbed antler dart recovered from the Choris site and a larger barbed whale-bone harpoon from the Chaluka site on Umnak Island as described by Laughlin (1962:123). Further support for Aleutian resemblances are the previously mentioned similarities in Choris and Aleutian doll figurines (McCartney 1984; Maschner 2008). However, as Mason and Gerlach (1995:24) themselves caution, there is not enough available evidence to authenticate such a model; therefore, to equate Choris with a horizon style is speculation without better radiocarbon dating. Also lacking are any finds of these organic items in the space between the Aleutians and Kotzebue Sound. If there were links between these objects and the Choris phase, they could attest to the dynamic communication patterns at this time in northwestern Alaska but not necessarily the movement of people.

Dumond's (2000) views differ significantly from both Anderson (1984) and Mason and Gerlach (1995). He perceives discontinuity between DFC and Choris lithic technology. Dumond (2000:11) notes that “about 80 percent of the classic Choris implement categories would be at home in the Pacific coast–Alaska Peninsula area,” and questions Anderson's link between the ASTt and Choris on the basis of lithic technology. However, he goes further, proposing that there is a lack of evidence for continuity between Choris and Norton (Dumond 2000:16)—Choris is so disparate in lithic, housing, and harpoon technology that it is unique and extraneous to the cultural sequence of the Kotzebue Sound area, similar to Old Whaling. While we do not see the differences between Choris phase and DFC tools to be as significant as Dumond proclaims and cannot overlook that people of the Choris phase and Norton tradition made the same pottery, we agree that, without further evidence, the *sui generis* of Choris is such that it should be treated as a phase without necessary connections to any one tradition.

Old Whaling

The *only* uncontested Old Whaling “component” currently known in the Arctic was discovered on Beach Ridge 53 at Cape Krusenstern. Giddings (1967; Giddings and Anderson 1984) first undertook excavation on this ridge in 1960–1961, after William Simmons had discovered the Old Whaling locality in 1959. These excavations revealed 10 dwelling structures located in two clusters containing five houses each. One cluster consisted of five deep semisubterranean houses—interpreted as winter dwellings—constructed with timbers, with entrance tunnels connected to round wall main rooms with one or two lobe-shaped alcoves adjacent to the tunnel (Figure 15.2). As described by Giddings and Anderson (1986:233), “the main room was based upon a four-post construction . . . [and] within the area enclosed by these posts lay the fireplace . . .

[surrounded] by a well-trampled floor.” The other cluster consisted of five shallow houses—interpreted as being used in the summer months—that were simple round structures consisting of a central hearth constructed on the surface surrounded by a light structure.

Based on the spatial arrangement of houses that imparted a seemingly ethnographic-like clarity, Giddings (1967:241) wrote: “The [shallow] lodges, like the deep houses, were clustered into a compact group, three toward the front of the beach and two behind. In view of the similar layout we could not escape the conclusion that people of the winter village simply moved into these other, summer, houses when melting ice flooded the floors of their winter homes.” During test excavations to determine the extent of the remaining archaeological deposits at the locality, Darwent and Darwent (2005) found this scenario problematic based on the stratigraphy of the beach ridge—the surface into which the winter houses were excavated was substantially deeper in the ridge than the surface upon which the summer houses were built. Furthermore, a buried house structure with Old Whaling artifacts was identified underneath one of the summer houses, demonstrating that multiple Old Whaling occupations had occurred in the location. Thus, instead of five families moving seasonally from winter into summer dwellings, Darwent and Darwent (2005) envisioned a group of people repeatedly returning to the same beach ridge over several generations.

Part of the reason for the “Old Whaling” label was the discovery of a large baleen-whale cranium approximately 50 m southeast of the “winter” settlement. Excavations around the cranium produced several pieces of lithic debitage, which led to speculation that the occupants of the site were actively engaged in whaling, especially when adding into the picture the exceptionally large bifaces discovered during the excavations of the houses. Although it is impossible to distinguish scavenging versus hunting of this whale, the occupants clearly made use of the carcass and included vertebrae as “furniture” within their semisubterranean houses. This use is suggestive of how whales were viewed at this juncture in time, as we do not see such incorporation of whale elements in this region again until after A.D. 800 during the Thule period.

Dates

Twenty-two radiocarbon dates have been published in conjunction with materials from the Old Whaling locality (Table 15.3). Of these, 11 likely are contaminated with marine oils (Mason and Ludwig 1990) and thus were excluded (Figure 15.1). With the exception of one date from House 21 (which has a ± 150 -year standard deviation), all fall into a tight cluster (Figure 15.1), and thus the occupation of the Old Whaling locality likely spanned ~300 years between 1150 and 850 cal. B.C.. Of note, the age of the Old Whaling component precedes the dates we ascribe to the Choris phase by at least 50 years, if not closer to 100 years (Figure 15.1). Therefore, if the “Old Whalers” encountered anyone when they moved into the region, these individuals would have been related to a latter phase of the DFC.

Lithics

The lithic technology from the Old Whaling locality is an outlier in comparison to the overall trend on the Northwestern Alaskan coast for stone-tool manufacturing, both prior to and after its occurrence. In terms of the attention garnered by a single group of artifacts, nothing quite parallels that given to the large Old Whaling bifaces. Although the discovery of side-notched projectile points provided initial excitement—the presence of which initially was thought “a Piltdown man type of thing” (Giddings 1967:229) because of their dissimilarity to known point forms from the coast—Giddings went on to exclaim that

another form of flintwork caused us even more excitement, however, than did the notched points. A very thin but broad and long point of gray chert had the dimensions of a harpoon blade, but its size was much greater than flint blades we knew to have been set into harpoon heads for walrus hunting. . . . This one, nearly four inches [~11 cm] long and nearly as wide, nevertheless appeared to be a whaling harpoon head. (Giddings 1967:229–230)

And thus a legend was born.

While many of the large endblade-like blades (Figure 15.2) could have been used to tip harpoons, no organic harpoon heads of the size needed to mount such a blade were recovered. Additionally, some of the large specimens (Figure 15.2), termed “lance heads” by Giddings (1964:230), were likely too large to function because of susceptibility to side-slap breakage. Unfortunately, little study of the blades or of the lithic assemblage (e.g., use wear, residue analysis) has been undertaken or published, and thus it is difficult to confirm how these tools functioned. Without further analysis we caution against ascribing them to whaling based on their size alone.

Although the bifaces at Old Whaling receive most of the attention, unifacial production of tools is actually more common. First, a large majority of flake tools (knives, scrapers, retouched flakes; see Figure 15.2) were made on large blades or blade-like flakes through unifacial retouch. While there have been no extensive studies of the debitage from stone-tool manufacturing—largely because it was not collected and screens were not employed during the initial excavations of the settlement—Darwent and Darwent (2005) found the debitage collected during their testing appeared to be produced through unifacial reduction based on platform versus dorsal scarring.

The large blades or blade-like flakes used for flake tools are reminiscent of blades used by earlier Paleoarctic traditions, and this may or may not be functional convergence. Generally, they are over 5 cm in length and 2 cm in width and have one or two central ridges running parallel to the long axis. Unfortunately no cores have been collected that would have been large enough for the production of these blades, so it is difficult to determine whether they were produced on actual blade cores or on some other form of core. Regardless, in a complete departure from the DFC, there is

no evidence for a microblade industry (Darwent and Darwent 2005; Giddings and Anderson 1986).

Prior to Old Whaling, DFC projectile points were usually small, finely flaked lanceolate and stemmed forms, often finished with a parallel oblique flaking pattern. While some of the Old Whaling points are equivalent in size to DFC projectile points, most are considerably larger, broader, and with more or less random directionality to flake removal. As a result, points associated with the Old Whaling locality are without precedence on the northwest coast of Alaska, but attempts have been made to link them to other cultures. Mason and Gerlach (1995) and Darwent and Darwent (2005), for example, suggested a potential affinity with interior Northern Archaic lithic industries. Largely this association is made because both have side-notched points, but also because both use large blades for flake tools, and chert recovered from Old Whaling has been visually sourced to the Noatak drainage (Darwent and Darwent 2005). Conversely, Dumond (2000) advocates for the Alaska Peninsula and Aleutian Islands as the source for Old Whaling based on the presence of a thriving maritime-adapted economy between 1250 and 850 B.C., and minimally superficial resemblances of stone-tool forms. In contrast, Ackerman (1998) submits similarities to assemblages uncovered on Wrangel Island to the northwest. While there is some merit to each of these hypotheses, they all suffer from missing a whole “suite” of traits characteristic of the Old Whaling component. Also, because of functional constraints, many side-notched point styles from different regions can look similar but may have no historical relationship. For instance, Giddings (1967:229) proclaimed that the Old Whaling side-notched points would look at home in the eastern United States. Thus the necessary and sufficient conditions for recognizing Old Whaling, like Choris, should be a similar *combination* of large bifaces and endblades, side-notched points, and flake tools made on blade or blade-like flakes, along with other aspects of the Old Whaling inventory (e.g., house styles, harpoons).

ORGANIC ARTIFACTS

Organic preservation was poor at the Old Whaling locality, limiting the number of organic artifacts. However, one important discovery was a single harpoon head made of antler recovered from one of the winter houses (Giddings and Anderson 1986:248) (see illustration in Figure 15.2). Although partially broken, it is a toggling single-spur open-socket harpoon with a central line hole. Overall, the harpoon is generic in appearance, but its presence does imply that the Old Whalers were highly maritime adapted, which is underscored by the almost exclusively small-seal-based diet (see below). On gross appearance, this Old Whaling harpoon is similar to specimens presented by Ackerman (1984:Figure 3k) from Devil's Gorge, Wrangel Island, though the latter are considerably larger and associated with walrus hunting.

Other organic artifacts of note were bone needles, wooden shafts, and a large burlwood bowl (Giddings and Anderson 1986). Unfortunately, most of the worked organic items were too fragmentary to assess function.

FAUNAL REMAINS

The faunal assemblage from the Old Whaling site comes from semisubterranean house features 22, 23, 24, and tent rings 201, 202, 203, and 205 (Darwent 2006; Darwent and Darwent 2005). Overall sample size for these seven features is considerably larger than from the three Choris features.

Small seal comprise most of the assemblage (98 percent of the NISP and 89 percent of the MNI), and based on species-specific elements, all are ringed seal. Using epiphyseal fusion as a proxy for prey demography, the winter assemblages have a higher frequency of adults and old adults that seem to correlate with breathing-hole rather than lead-ice hunting (see Darwent 2006). Caribou and birds, although minimally represented, are relatively more frequent in the shallow dwellings, which were most likely occupied in summer as conjectured by Giddings (Giddings and Anderson 1986). Overall, the faunal remains suggest that the “Old Whalers” had a strong year-round maritime orientation.

DISCUSSION

There appears to have been a significant amount of cultural “flux” in the period between 1200 and 400 B.C.—the Old Whaling manifestation appears without antecedent on the northwestern Alaskan coast and then departs without successors, and Choris, while possibly a continuation of the already-present AST lithic tradition, has the inclusion of technological elements from disparate locations such as southwestern Alaska and Siberia. It is also possible that Choris is as unique as Old Whaling (Dumond 2000) and extraneous to the sequence of cultural development in Kotzebue Sound. If Choris is an extension of ASTt, it would be reasonable to assume that during the time prior, there was potential coexistence of the DFC and Old Whaling peoples. The nature of this coexistence is unknown, but based on the presence of what appears to be interior cherts in the Old Whaling assemblages (Darwent and Darwent 2005), either Old Whaling people had direct access to the sources of this chert (and therefore had to have had implicit understanding of where these materials were located) or there was interaction—either trade or minimally an exchange of information—between them and the existing DFC or interior Northern Archaic cultures.

Our current understanding of the prehistory of Northwest Alaska between 1200 and 400 B.C. still hinges on a culture-historical sequence constructed on the findings from

only three locations excavated over 50 years ago: the beach ridges of Cape Krusenstern, Onion Portage, and the Choris site. With the exception of small-scale testing at the Old Whaling site in 2003 (Darwent and Darwent 2005), no new research has occurred at any of these sites. However, and more importantly, no additional sites from this time period have been documented or extensively investigated that can be clearly demonstrated to belong to either Old Whaling or Choris. Thus we must invoke that overused phrase that more research—particularly *excavation*—must be undertaken in this region to understand both of these archaeological entities. To date, a detailed skeleton has been constructed for northwestern Alaskan prehistory. However, just like paleontologists discovered that in reconstructing *Brontosaurus* skeletons someone had mounted the wrong genus's head onto the skeleton of an *Apatosaurus*—which necessitated a change in dinosaur taxonomy—we might find that archaeologists find new cultural evidence that necessitates future reassessment Old Whaling components and the Choris phase. Such is science.

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CHAPTER 16

NORTON HUNTERS AND FISHERFOLK

DON E. DUMOND

NORTON culture commonly designates a relatively homogeneous set of assemblages of the western Arctic that at their maximum were scattered over territory having a southern limit on the Alaska Peninsula in southwestern Alaska, and a northern distribution around the Alaskan coast and its hinterlands to the Arctic coast and the mouth of the Firth River, a short distance east of the modern border with Canada. In time, the maximum period covered by the various components extended from possibly as early as 500 B.C., in the vicinity of Seward Peninsula and the Bering Strait, to as late as about A.D. 1000 on the Alaska Peninsula to the south, with timing distinctly different according to region: from the Seward Peninsula northward, Norton occupations are visible only into the first few centuries A.D., at which time Norton occupations are replaced by those of the Ipiutak culture—with which there are many Norton similarities, but which lack important Norton attributes such as stone lamps for burning sea-mammal oil, and pottery. Well south of the Seward Peninsula, however, Norton components have been placed as early as a calibrated date of 300 B.C. and clearly related occupations persist until the end of the first millennium A.D., by which time many are clustered along southern Alaska streams that receive substantial runs of one or more of the species of Pacific salmon.

A CHARACTERIZATION OF NORTON MATERIAL CULTURE

In material attributes, Norton culture has been said by one careful commentator (Workman 1982) to have three basic defining attributes: pottery, small side-hafted blades of chipped stone (i.e., sideblades), and at least some appearance of implements of polished slate, albeit these are sometimes crude. Beyond this, in most collections

the material toolkit is characterized by chipped stone projectile endblades or knives of several consistent forms, small adze blades of chipped stone with polished cutting edges, polished grooving tools referred to variously as polished burins or as “burin-like” tools, and binotched pebbles interpreted as net sinkers. Other objects of stone include pecked and polished basins, most but not all of them used for burning sea-mammal oil, and especially lip ornaments or labrets, commonly of lignite (see Figure 16.1). It must be emphasized that any one of these attributes may be found shared with neighboring cultures, and although at least the three “basic defining attributes” as a group have been said to be integral to the definition of Norton culture wherever found (Workman 1982, as above), it now seems that even this is not always the case, as will be indicated. Nevertheless, there does remain a constant combination of artifacts, especially including relatively thin-walled pottery, often with characteristic surface decorations, and recurrent styles of projectile end- and sideblades of chipped stone.

Especially noteworthy is this occurrence of pottery, commonly tempered with fiber of some sort, usually decorated by external check- or diamond-shaped impressions applied with a paddle bearing sets of parallel grooves usually oriented at approximate right-angles to one another; this is generally referred to as “check stamped,” although occasionally, especially in Russian literature, it may be called something like “waffle impressed”; of less frequency in general is pottery with external impressions made by paddles with a single set of parallel grooves, referred to in most of the northern literature as “linear stamped” (see Dumond 1987a:106–113 for a somewhat longer description of Norton culture). In much, although not all, of the area of distribution this Norton pottery represents the earliest local occurrence of ceramic ware; the exception is the more restricted region of the somewhat earlier Choris culture north of Bering Strait, in which occur linear-stamped ceramics essentially indistinguishable from the comparable Norton ware, and without doubt related to it in origin from the Asian mainland to the west, but in which chipped stone artifacts are for the most part strikingly dissimilar.

Despite the richness of some Norton sites, the recovery of artifacts of organic material has been poor. Few perennially frozen sites have been explored; this is in part related to the relatively southern occurrence of most of the sites but also to the fact that although the earliest Norton occupations occurred near the close of a relatively cold interval, others extended into an ensuing time of somewhat warmer temperatures. In those few frozen sites that have been explored, organic artifacts include toggling harpoon heads, largely of antler and many of which are relatively rudimentary, consisting of a single valve marked by a broad groove designed to both hold the end of the harpoon line and to affix the head lightly to the end of the harpoon shaft (see Figure 16.2).

DISCOVERY AND DESIGNATION

In 1948, J. Louis Giddings excavated at the site of Iyatayet on Cape Denbigh, which is located at the entrance to Norton Bay from Norton Sound immediately south of the

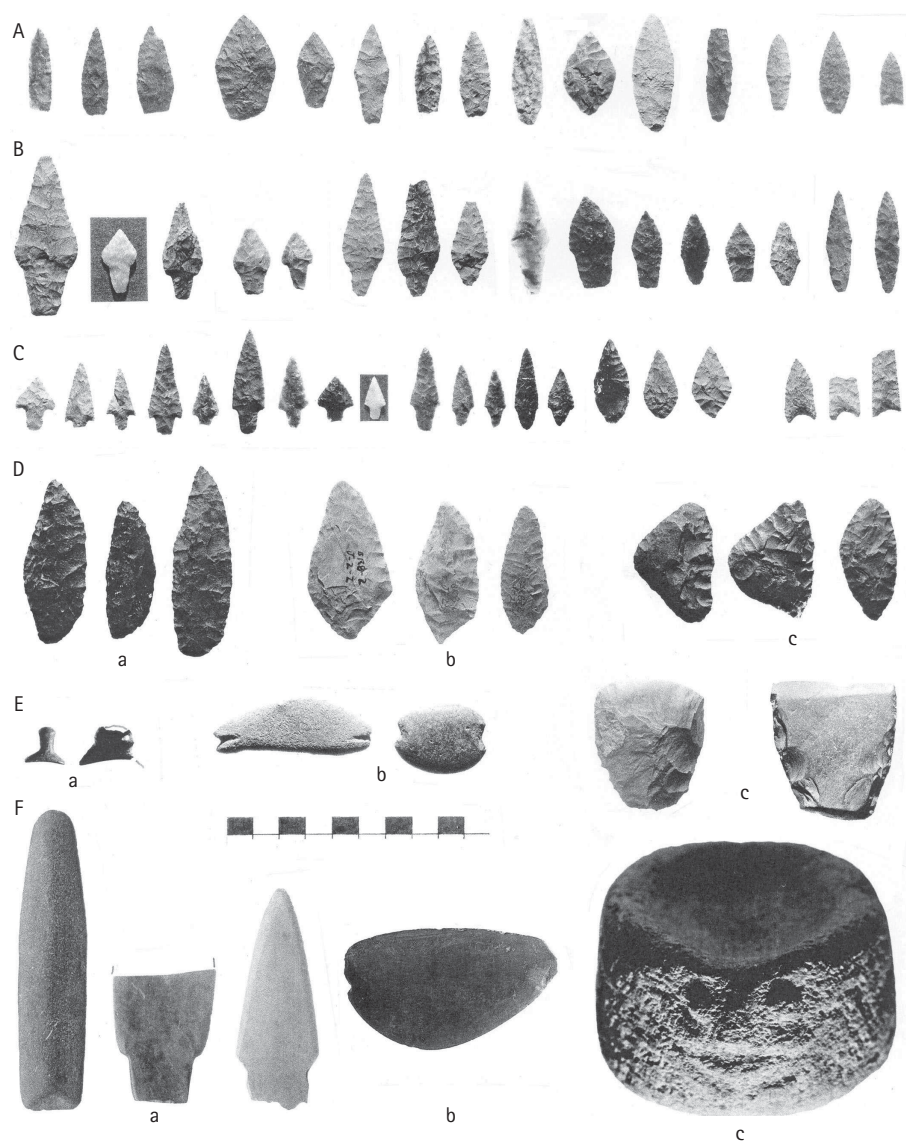


FIGURE 16.1 Norton culture stone artifacts from the Naknek River region, northern Alaska Peninsula. (Row A) endblades of the earliest Norton (Smelt Creek) phase, ca. 300–1 B.C.; (row B) endblades of the middle Norton (Brooks River Weir) phase, ca. 1 B.C.–A.D. 700; (row C) endblades of the latest Norton (Brooks River Falls) phase, ca. A.D. 700–1050 (row D) sideblades: (a) Smelt Creek phase; (b) Brooks River Weir phase; (c) Brooks River Falls phase. (row E) (a) labrets, Brooks River Falls phase; (b) notched pebble sinkers, Brooks River Falls phase; (c) chipped adze blades with polished bits; (row F) (a) polished slate knives or lance blades, Brooks River Falls phase; (b) polished slate ulu blade, Brooks River Falls phase; (c) pecked stone vessel, lamp-like in form but with other stains in the basin, unique in the presence of the face pecked on one end (lateral labrets depicted below the mouth); recovered from a Brooks River Weir phase house aged at ^{14}C 1850 $\pm$ 100 (I-210), calibrated ca. A.D. 170 (Dumond 1981: Table 6.19, Figure 6.14; 2011: Table 5.2). Composite of photos by Don E. Dumond scale in cm.

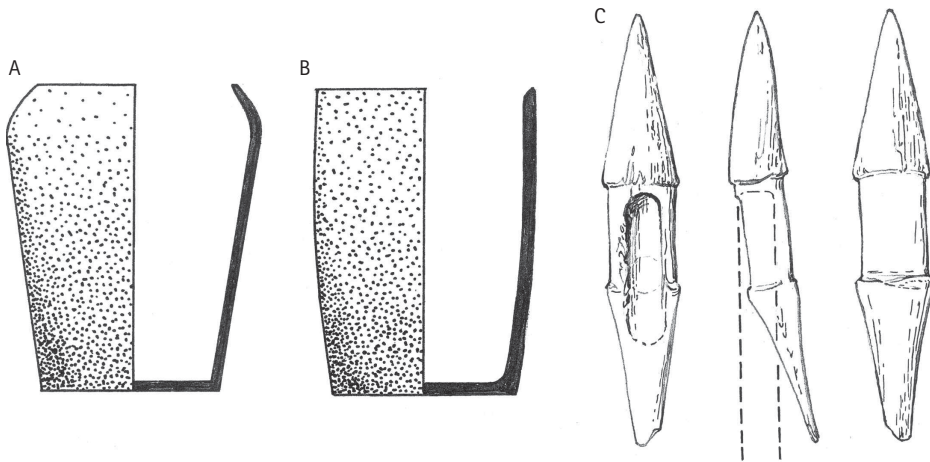


FIGURE 16.2(A, B) Norton culture pot forms from the Naknek River region, northern Alaska Peninsula, heights 24–26 cm: (a) earliest Norton (Smelt Creek) phase; (b) middle Norton (Brooks River Weir) phase; (c) Norton (Duchikmiut phase) toggling harpoon head, antler, from Nunivak Island, L8 cm. Renderings by Carol Steichen Dumond, published with permission.

Seward Peninsula. Here he found a component of what he christened the Norton culture, located stratigraphically beneath a late prehistoric Eskimo culture he called Nukleet, and above the first finds of the Denbigh Flint complex (Giddings 1949); this Norton component was to be dated by the early radiocarbon method as early as 2200–2300 ^{14}C years ago, which calibrate at about 250 or 300 B.C. and which Mason and Gerlach (1995) conclude on several lines of evidence could not reasonably indicate a date earlier than 500 B.C.

However, Giddings's Norton assemblage, generally as characterized above, does not represent the first encounter with vestiges of the same culture. The first of such discoveries were without archaeological context—two separate finds made in the late 1920s and 1930s by researchers on the coast of the Seward Peninsula and at the Okvik site on the Punuk Islands near St. Lawrence Island (Collins 1928; Rainey 1941:536). Somewhat more complete discovery information regards an eroding midden found by Henry B. Collins in 1936 on an island that frames a coastal lagoon near the western point of Seward Peninsula (Dumond 2000a). The same site was located again by Giddings in 1959 (Giddings and Anderson 1986:163–167), on what he then christened Kugzruk Island, and was dated on wood from a midden at 2306 ± 38 ^{14}C years before present, with two nearby house tests dated on some mixture of “charcoal and sand” at around 2,500 such years ago (P-592) (Giddings and Anderson 1986:30). These suggest a calibrated date at least as early as 300 B.C., and likely even two centuries earlier.

The first actual description of Norton artifacts, however, was under the category of “Near Ipiutak”; these were specimens obtained as part of the largely Ipiutak culture collection that was excavated at Point Hope by Larsen and Rainey (1948) between 1939 and 1941. Among the more than 70 Point Hope houses and 160 burials excavated at that time, one house, 12 burials, and several middens revealed materials that varied from the mass assigned to the Ipiutak culture. Among these finds were harpoon heads of ivory, bone,

and antler, some similar to those of Ipiutak, and armed with sideblades or insert tips of chipped stone; but others were more rudimentary—self-armed, with open socket and single broad lashing groove (cf. Figure 16.2:c). There were also two very large harpoon heads of ivory, deemed to be for whaling. Although a large number of the chipped stone artifacts—knives and projectile points—were closely similar in form to those of Ipiutak, others were recognizably variant, and in addition the collection included a pair of knives of polished slate, a transverse knife or ulu of the same material, and one rather crude stone vessel, the basin of which indicated use as an oil-burning lamp—none of which was duplicated in the Ipiutak assemblage. With the passage of some years and the reports of other sites, Larsen classed this aspect of Point Hope as Norton, and later ¹⁴C determinations provided ages equivalent to dates in the late centuries B.C. (Larsen 1982), which is several centuries before the earliest occupation assigned to the Ipiutak culture.

SPACE AND TIME

Distribution

As indicated previously, it was in 1948 that Giddings had begun exploration of the Iyatayet site at Cape Denbigh. And that same year, Larsen discovered Norton-like assemblages farther south on the Bering Sea coasts—at Chagvan and Nanvak bays and near the modern village of Platinum (Larsen 1950). All of these revealed similarities to the Ipiutak culture described by Larsen and Rainey (1948), but with the addition of stone lamps or ceramics or both. At Cape Denbigh, Giddings continued research until 1952, by which time he was able to complete a definition of his original Norton culture (especially Giddings 1964)—the collection being essentially as indicated above, with chipped stone points, knives, scrapers, stone lamps, and pottery, with labrets and also binotched stones presumed to be fish net sinkers. Here, as in so many Norton sites, organic preservation was poor, but there were five simple toggling harpoon heads and a pair of arrowheads. Faunal remains were chiefly of seal (86 percent), some other sea mammals (12 percent), and a few caribou (2 percent). The few houses excavated were semisubterranean, roughly square, with an internal fireplace and an entry passage sloping from outer ground surface to floor (see Figure 16.3 for a southern example). Radiocarbon evidence suggested calendar dates between about 400 and 1 B.C.

Within 10 years of these excavations, sites yielding comparable assemblages had been reported at coastal extremes: from the Bering Sea coast as far south as the northern portion of the Alaska Peninsula (Dumond 1962), and as far north and east as northwesternmost Canada (MacNeish 1956). Within another decade, Norton sites had been identified between the mouths of the Kuskokwim and Yukon rivers (Shaw 1982, 1983), around Unalakleet (Lutz 1972, 1973), on Nunivak Island (Nowak 1970, 1982), at Cape Nome (Bockstoce 1979), in the Kotzebue Sound region (Giddings and Anderson 1986), and near Point Barrow (Hall 1982; Stanford 1976:16).

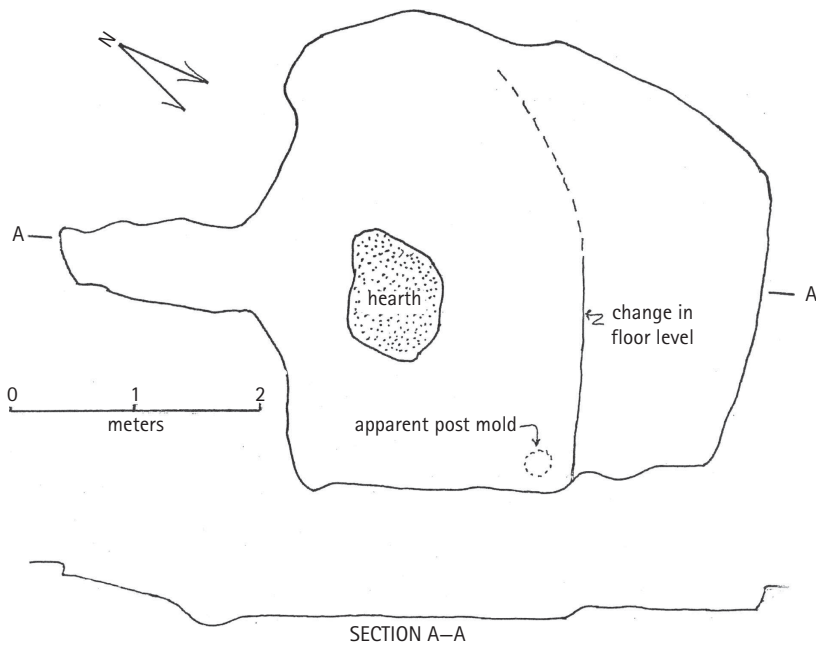


FIGURE 16.3 Norton culture (Brooks River Weir phase) house from the Brooks River region, Naknek River drainage, northern Alaska Peninsula. Excavated by National Park Service personnel in 1988–1989, the hearth yielding ^{14}C ages of 1960 ± 90 and 1960 ± 140 (Beta-27782, 27783), calibrated ca. A.D. 50 (Dumond 2011:Table 5.2). Redrawn by Don E. Dumond from National Park Service clearance form No. 003-89-KATM, Figures 9 and 10, with permission.

Since that time, Norton sites have continued to be reported on the Bering Sea coast (e.g., Harritt 2006), on streams among the complex of salmon-rich lakes north of Bristol Bay (e.g., Shaw 1990), on the Bristol Bay shore (McMahan et al. 2000) and on islands within the bay (Bailey 1991; Schaaf 2009b; Shaw 1986) (the southeasternmost extension of the Bering Sea), at the northeastern extreme of the Alaska Peninsula (Bundy 2007; Reger and Townsend 1982), and as far southwest on the Peninsula as the complex of rivers feeding into Ugashik Bay (Henn 1978; Hoffman 2009; Saltonstall et al. 2012). Other presumed influences reflected in more scattered artifacts, although not in actual settlements, have been reported at the mouth of the Mackenzie River and somewhat eastward on the Canadian Arctic coast (Arnold 1980, 1981; LeBlanc 1994; McGhee 1974). At the very southern extreme, characteristic Norton ceramics and a few other diagnostic artifact classes have been reported in sites on the Pacific coast of the Alaska Peninsula, where associated ^{14}C ages indicate dates between about A.D. 1 and A.D. 1000 (Clark 1977; Dumond 2011). Throughout this great area, assemblages of chipped stone artifacts from the recognizably Norton sites are remarkably uniform, ceramics are chiefly check stamped. For the most part, houses—where explored enough to clearly determine form—are roughly square and excavated into the contemporary surface, measuring somewhere around 4 to 6 meters on a side, with sloping entrance passage and internal

hearth (Figure 16. 3). Organic artifacts are generally few as a result of poor preservation. Some variations in houses will be indicated later.

Chronology

As discoveries continued it became clear that the chronology of Norton occupation was different between the coasts of the Chukchi and Bering seas. From the Seward Peninsula northward, Norton sites have been dated chiefly from the second half of the first millennium B.C. to around A.D. 1 or a few years later, not long afterward to be replaced by Ipiutak culture sites. Around the more southerly Bering Sea, however, Norton culture occupations span the period from 300 B.C., or earlier, to the end of the first millennium A.D., when they were replaced by sites of a still more maritime people related to those of the Thule culture.

Further, in keeping with the longer sequence in this region of the Bering Sea (see Dumond 1984), the developmental sequence has also been divided chronologically. On the northern Alaska Peninsula, three sequential phases are defined (Dumond 1981); marked by stylistic changes in artifacts such as chipped points and side-blades (Figure 16.1:A–C) and pottery form (Figure 16.2:a–b). At Chagvan Bay, near the north-western extreme of Bristol Bay, there are three named sequential units (Ross 1971); on Nunivak Island there are early and late subphases (Nowak 1982); at Unalakleet, “early” and “developed” aspects (Lutz 1972); and at Cape Nome on the south shore of the Seward Peninsula two sequential phases have been defined (Bockstoce 1979)—all of these in largely stylistic terms. At the site of Manokinak in the Yukon-Kuskokwim delta region, occupation began only in the late Norton period, around A.D. 400, and at the end of that millennium was apparently transformed into a later and recognizable prehistoric Eskimo culture that has been assigned to the Thule or Northern Maritime tradition (Shaw 1983).

In addition, available ^{14}C ages suggest a difference in the time of appearance of the first Norton occupations: the earliest dates from the Seward Peninsula are two suggesting possibly 500 B.C. from Kugzruk Island (Giddings and Anderson 1986:30), whereas the earliest from the Alaska Peninsula is closer to 300 B.C. (Dumond 1981:135). This argues for a movement of Norton culture people from north to south. Furthermore, the appearance of the Norton people in the south, at least in the Naknek River region of the northern Alaska Peninsula (Dumond 1981), followed a period of more than 500 years in which there is no evidence of human occupation at all; this absence is possibly owed to an increase in volcanic activity on the peninsula, although the precise cause is uncertain. But it is clear that there was no immediate cultural past, developmental or otherwise, in that region.

Subsistence

The consistent presence in the Norton deposits of notched stones interpreted as net sinkers (Figure 16.1:Eb), and the location of major Bering Sea coastal sites near the mouths of streams that receive annual runs of salmon, together with the presence of other sites well upriver on the same or similar watercourses (e.g., Dumond 1981, 1982; Henn 1978; Hoffman 2009; Saltonstall et al. 2012), indicate a focus on river fishing and the harvest of

runs of the salmon that are found principally south of Bering Strait. Presumably it is this interest in harvesting anadromous fish that is largely responsible for the relative absence of a more continuous and developed Norton occupation farther north, where such runs are attenuated or absent (see e.g., Lutz 1982; Shaw 1982).

But the presence of sites of substantial size on the coast and the relative plenty of toggling harpoon heads (where preservation permits recovery) indicate an interest also in the hunting of sea mammals. This is underscored by the presence of sites on insular locations such as Nunivak Island, and especially on islands in northern Bristol Bay (Bailey 1991; Schaaf 2009b; Shaw 1986). Here significant differences can be noted, however, for whereas Nunivak Island, of larger size, was clearly the location of established and relatively sedentary Norton settlements, the sites on the islands of Bristol Bay are in large part without ceramics, providing a suggestion of more temporary, seasonal occupation.

In addition to this, as noted above, after the beginning of the Christian era elements of Norton culture (and presumably some of its bearers) infiltrated onto the Pacific coast of the Alaska Peninsula and also onto some shores of Cook Inlet. Presumably, this can be attributed to an improved ability to hunt in open water and the tempting quantity of sea mammals present (Clark 1977; Dumond 1969a, 1998; Workman 1982). It should be emphasized, however, that the only apparent toggling harpoons of a size and design suitable for whaling are the pair reported above as coming from the site at Point Hope.

Furthermore, Norton interest in the more interior regions was evidently not confined to fishing. Even though substantial collections of faunal trash are lacking, the predominance of caribou antler as raw material for the few surviving organic implements (e.g., Giddings 1964:140–146; Nowak 1982) suggests a strong interest in those terrestrial herd animals. The southern hinterland of the Norton sphere covered annual migratory pathways of several caribou herds, where there are both ephemeral Norton campsites and also some fairly substantial habitation sites located on rivers but well away from the coast. These latter areas include the Alaska Peninsula (Bundy 2007; Dumond 1981; Henn 1978), the lakes region north of Bristol Bay (Shaw 1990), and probably the vicinity of Iliamna Lake northeast of the Alaska Peninsula (Reger and Townsend 1982). In this region relatively ephemeral campsites—as on some islands of Bristol Bay—have yielded small artifact samples without pottery or stone lamps, and only vaguely diagnostic projectile points or scrapers, which can, however, be attributed with reasonable confidence to Norton people (e.g., Ackerman 1979; Dumond 1987b:136–141). In the north, however, where Choris and Ipiutak sites may be present with chipped stone artifacts often similar to Norton specimens, the cultural identification of such small sites is less certain.

As indicated above, in the last centuries before the Christian era sites of the Norton culture extended over much or all of the coast and coastal hinterlands of Alaska from the Alaska Peninsula in the south to the Canadian border in the north, and possibly somewhat farther eastward into present Canada. At the same time, there is no evidence of a specifically Norton presence on the Asian side of Bering Strait, including St. Lawrence and neighboring islands, despite the faint suggestion conveyed by the few diagnostic Norton sherds in the Okvik collection from the Punuk Islands. Some more general similarities in northeastern Asia will be mentioned below, however. In sum,

people of Norton culture in their more southerly center of gravity were very largely fisherfolk of the rivers, who secondarily engaged actively in the hunting of caribou and the coastal hunting of sea mammals, including at least some pursuit of ocean species in open water, although with the only possible evidence of whaling confined to the site at Point Hope.

WITHIN-TERRITORY VARIATION

Variations in the spread of Norton sites through time and possible variations in subsistence have been mentioned. Beyond this, there are several additional dimensions of variation that will be noted here. The final variation addressed will also be shown to reflect on the minimal definition of Norton that was mentioned at the outset (i.e., the threesome of chipped knives and sideblades, ceramics, and polished slate), which will need to be modified.

Size of Living Units

Site size. Many of the Norton sites reported are small, consisting of a midden or a very few surface depressions, although such sizes may also reflect limited survey and testing, landforms that constrain site size, or specific subsistence practices. On the other hand, there are numerous sites in which the numbers of apparent house depressions are substantial. For example, in the more northerly area of the Bering Sea, the “Old Beach” site at Cape Nome reportedly includes more than 300 apparent house depressions presumed to represent Norton occupation (Bockstoce 1979). The Norton site of Difchahak, near modern Shaktoolik, was reported by Giddings (1964:184) to include some 99 very deep house depressions, but more recent work has mapped more than 200 depressions, of which 150 are considered houses—generally subrectangular and with apparent entrance depressions (Harritt 2006). Near modern Unalakleet, the site UngaLakLik is described as some 400 m in length, on which are about 200 apparent house depressions (Lutz 1973).

At the southern edge of Norton distribution, site DIL-161 on the middle course of the Alagnak River on the northern Alaska Peninsula, is described as consisting of more than 46 surface features (depressions), of which more than 30 were concluded as probably Norton (Bundy 2007). On the 2 km long Brooks River, of the 600 enumerated depressions concluded to contain remnants of human occupation (Dumond 1981:Table 3.1), fewer than 20 were enumerated on the one landform that seems to contain *only* Norton-period occupation, but significant indications of Norton remains have been encountered in 14 of the total 24 site localities tested on the river; thus it is not wild to suggest that even as many as 300 of these 600 productive depressions would yield at least some evidence of Norton presence.

Farther to the southwest on the Peninsula, in all three of the major sites tested on the streams that empty into Ugashik Bay, substantial numbers of presumed house depressions of Norton age are reported. In work at the Ugashik Narrows site (Henn 1978), 58 apparent house depressions were presumed to represent Norton occupation, although no systematic test was made of that expectation. On the adjacent King Salmon River, at site UGA-052, more than 60 Norton-period houses were thought to be represented (Hoffman 2009), and at UGA-050, at least 98 structures visible on the surface were presumed Norton (Saltonstall et al. 2012).

In all of these sites Norton occupation must have lasted for several centuries, although the question of contemporaneity of house occupations has been answered in none of them. In any event, populations of 100 people or even considerably more might well have been achieved in each of them in their heyday. There is also a question of subsistence focus. Sites at the northern edge of the Bering Sea are located on the coast and presumed to focus strongly on direct oceanside resources, including sea mammals. In the south, on the other hand, the reportedly larger sites are positioned on productive salmon streams a sufficient distance from the coast to suggest that sea-mammal harvests were not a primary subsistence focus in the seasons of occupation. Indeed, Shaw (1982) has suggested that as the Norton period progressed it was only as fishing technology developed that occupation was expanded from the coast into what proved to be salmon-rich streams in the coastal hinterlands. This suggestion certainly wants further research, but it does appear that with the exception of the Naknek River drainage area, all of the Norton-period sites reported in the southern extreme of the distribution represent primarily the middle and later Norton periods—that is, at least after the calendar date of A.D. 1. This question of temporal variation (affecting areal variation) was touched on earlier, and will be returned to again.

House size. There is at least a certain amount of variation in house sizes, especially as reported from surface depressions of probable houses. For the most part, the bulk of the presumed habitation depressions present a diameter of no more than 6 m or so, with areas little exceeding 30 m². One excavated example of greater size is the largest house of the UngaLakLik site (8 × 12 m) reported by Lutz (1973), who on the basis of artifact yield tentatively concluded it to represent a *karigi*, or men's house (on the model of later north Alaskan Eskimos). Otherwise, however, much size variation has simply been noted from surface indications.

Thus, at Brooks River, Dumond (1981:47) reports a deep and roughly round depression of more than 8 m diameter located immediately next to an early Norton-period occupation site and in which volcanic ash stratigraphy seems to indicate contemporaneity with the Norton occupation; although the large depression was tempting, no attempt was made to excavate it because the field crew of the season wasn't big enough. At site DIL-161 on the Alagnak River, Bundy (2007:Table 1) reports one "very large single-room" house with area in excess of 60 m². On the King Salmon River at site UGA-052, Hoffman (2009) reports a large depression some 12 × 14 m in surface size, and at site UGA-050, Saltonstall et al. (2012) report at least one depression close to 80 m² in area. Although no large structure was completely cleared at either of these sites, of 17

surface indications tested at UGA-050, five were considered houses, six were of specialized function (especially subsistence related) and for six no probable function could be determined (Saltonstall et al. 2012).

It seems evident that the variations in structure size, especially within the larger sites, is significant in terms of the organization of subsistence practices or of other social organizational dimensions. Thus far, however, the report by Lutz (1973) is the only one to more fully address the question by completely clearing an unusually large structure.

Variation in Artifact Types

Labrets and lamps. The categories of both lip ornaments and stone basins can be reasonably dispensed with quickly: both are relatively rare types, and it is to be expected that artifact inventories of smaller sizes often will not include them, despite their fairly uniform presence throughout Norton territory. Further, however, it is well to note that both of these artifact categories must have had origins south of the Norton sphere. With regard to lip ornaments (Figure 16.1:Ea), around the Gulf of Alaska they were worn by 1500 B.C., and they were in use at least as early in the eastern Aleutian Islands. Still farther south, labrets were common along the Northwest Coast as far as Puget Sound in present Washington state, with the earliest evidence of all from islands off the coast of British Columbia, dating at least as early as 2000 B.C. (Dumond 2009, with references). Similar, although with an origin apparently not quite so far to the south, is the case of stone vessels, largely but not solely used as lamps. The earliest of these are dated at more than 7,000 calendar years ago in the Kodiak Island section of the Gulf of Alaska (Fitzhugh 2003:154–155, Figure 3.3b; Schaaf 2009a).

Pottery. In contrast, the area of origin of Norton ceramics is certainly to the north. For an ultimate Siberian derivation of these ceramics there has never been a serious question, the Asian source having been recognized consistently (e.g., Ackerman 1982; Anderson 1980:243; Griffin 1970). In addition, the linear-stamped pottery recovered from some Norton sites has been considered identical in paste and design to pottery from the immediately earlier Choris culture that is known especially from the region around Kotzebue Sound, with the check-stamped varieties of Norton ware identical again in paste and all save surface decoration (e.g., Dumond 1969b, with references). It can be noted that in general the Norton assemblages of the Alaska Peninsula most like that at the type site of Iyatayet are those from before about A.D. 1 (Figure 16.1:A, Db). So, with regard to pottery (1) there is a tendency around the Bering Sea for linear-stamped ceramics to disappear from most of the sites in which they have been found at all (where they are also commonly outnumbered by check-stamped sherds) and (2) a tendency for pot shapes to change (Figure 16.2:a, b), while (3) in the Naknek River region, check-shaped stamps on later pots are found in larger sizes, from an earlier mean of 2 mm or so on a side, to a later mean closer to 5 mm (a change reflected also on Nunivak Island [Nowak 1982] and perhaps elsewhere).

Polished slate. As noted at the outset, at least some polished slate has been considered one of three definitional artifact classes in Norton collections. Giddings, not long after his discovery at the Iyatayet site of what he christened Norton culture, indicated that an

important part of “Norton cultural affinities are seen in the direction of the Pacific coast sites of southern Alaska”—this on the basis of stone lamps, labrets, and “rudimentary scraped and ground slate”—although he also saw the ceramics as part of “a widespread pottery continuum,” and otherwise found that the Norton assemblage “strongly parallels the . . . Near Ipiutak deposits at Point Hope” in the north (Giddings 1960:125). Now, however, reservations must be entered with regard to any completely consistent presence of ground slate of even “rudimentary” form in Norton collections.

Of the five major site vicinities on the Alaska Peninsula that have been referred to, three of them—UGA-052 and UGA-050 on the King Salmon River (Hoffman 2009; Saltonstall et al. 2012) and site DIL-161 on the Alagnak River (Bundy 2007)—have produced no slate implements or manufacturing debris. The Norton areas of the Ugashik River sites, despite producing a reasonably substantial artifact sample, yielded only one small rod of polished slate and nine fragments of manufacturing debris (Henn 1978:130, 135). Further, although the initial excavations of Norton sites in the Naknek River drainage were taken to indicate that polished slate was an early Norton property there, continued consideration of these earliest Norton sites (of the Smelt Creek phase)—stratified, with the Norton deposits underlying those of heavily slate-using people of the second millennium A.D.—has led to the conclusion that the appearance of polished slate in proper context in these sites is rare, if it occurs at all. Rather, when it first occurs clearly within the context of Norton culture, it is during the intermediate phase of the local Norton period, the Brooks River Weir phase, dated to the very early centuries A.D. And this was exactly the time in which pottery of middle Norton type appears on the Pacific coast of the Alaska Peninsula in an otherwise coastal cultural context—this in the Cottonwood phase of Takli Island (e.g., Clark 1977:39)—in confirmation of the presence of contact across the peninsula and its mountainous ridge, the Aleutian Range. Thereafter, the incidence of polished slate artifacts increased in the Naknek region, as did the incidence on the Pacific coast of various artifacts of Naknek drainage type (Dumond 2011).

Earlier, there had been two separate examinations of the possible directional spread of slate technology in western Alaska (Dumond 1968, 1988), both of which recognized that although the very consistent use of polished slate had begun as early as 1500 B.C. in the Kodiak Island region of the Gulf of Alaska, in the early years A.D. and before, the polishing of slate was much more common in the Bering Strait region than it was around the southern Bering Sea. Specifically, it was concluded (Dumond 1988:383) that “by A.D. 200, if not earlier, the people of St. Lawrence Island were making use of polished stone almost as frequently as were their contemporaries of the Pacific coast. At that time there were two centers of stone polishing in southern and western Alaska: one to the south and southeast on the Pacific coast, the other at Bering Strait,” whereas the Norton-culture region between the two made much less use of the technology.

How might this be explained? Work in recent years by archaeologists of the Bureau of Indian Affairs at sites evaluated in accordance with section 14(h)(1) of the Alaska Native Claims Settlement Act has confirmed the identity of at least five potential slate quarries around areas of the Bering Sea from Nunivak Island north: one on southern Seward Peninsula (Harden 1990), two in the Norton Sound area (USBIA 1984a, 1984b),

one somewhat northeast of Scammon Bay (Shide-Cochran and Pratt 1988), and one on northern Nunivak Island in the Nash Harbor area (Drozda 1994). South of this, no sources have apparently been reported between the Nunivak Island region and the Gulf of Alaska near Kodiak Island. Thus, the southward colonization by Norton people, with a major interest in fishing, would have led them away from slate sources until they arrived near the Pacific shores, at which point slate had been in heavy use for millennia, with the sources under control of non-Norton inhabitants. Some of the new Norton colonists, such as in the Naknek River region, were then able to engage in relationships with these coastal people that provided for them a source of slate, whereas other Norton folk—such as those established along the productive salmon streams to the southwest, such as the Ugashik and King Salmon rivers—did not reap fortune in the same way.

The overall conclusion to be drawn is that slate polishing is to be expected in early Norton sites of the region from Nunivak Island (as reported by Nowak 1982) and northward, with less to be expected around the southern Bering Sea until such time as direct contact was established with Pacific coastal people—an occurrence that is not confirmed at all excavated Norton sites of the region, as has been shown.

THE ORIGIN OF NORTON

In addition to the ceramics, prototypes for some of the chipped endblades and sideblades of especially the early Norton sites are with equal consistency recognized in collections related to the Denbigh Flint complex of northwestern Alaska. In place for essentially two millennia before the earliest-known appearance of Norton sites, these Denbigh hunters of terrestrial animals, especially caribou, occupied essentially all of the Alaskan territory covered by the later Norton people, to whom they might be considered donors not only of the chipped stone sideblades, but also of polished grooving tools or burins, and small chipped adze blades with polished bits (see Dumond 1987a:79–86 for a summary description). Here, however, much of the similarity stops, for the Denbigh people were nonlabret people, non-polished-slate people, nonlamp people, and for the most part—in Alaska, at least—noncoastal people.

So far as the Norton cultural sphere is concerned, then, one can recognize a mixture of elements from both north and south. As mentioned repeatedly above, elements of fairly direct southern origin apparently included the practice of lip ornamentation and the ubiquitous stone lamps; less directly, and whatever the case with slate polishing, the south can be suspected of having provided the propensity to hunt sea mammals in the open ocean, for the earliest evidence of a complete oceanside adaptation in the Bering and Chukchi seas can be recognized in the region of the easternmost Aleutian Islands around 7000 B.C. (Dumond and Bland 1995). And yet the evidence from southern Alaska suggests that the specifically Norton culture did not develop in the south, but arrived with people from the north. With this arrival came certain small, asymmetrical chipped bifaces reminiscent of artifacts of the Denbigh Flint complex as a representative in northern Alaska of

the Arctic Small Tool tradition (Dumond 1987a:106–113), and, of course, pottery derived from Asia, with the ceramics in particular, as indicated previously, essentially identical in important respects to the ceramics of the earlier Alaskan Choris culture. Beyond this, certain archaeologists working in northeasternmost Asia have remarked specifically on general similarities of some assemblages from that region and those of the Norton culture. Nikolai N. Dikov, for example, finds parallels with his North Chukotkan culture, although it is the check-stamped ceramics that are especially stressed (Dikov [1979] 2004:109–110), while comparable elements in both the Ust-Belaia culture of northern Chukotka and the Norton culture of Alaska are suggested to have been important in the origin of the Okvik culture of Bering Strait (Dikov [1979] 2004:140–141).

How are aspects of both south and north to be reconciled in terms of the probable origin of Norton culture? As has been noted (Dumond 2000b), southern aspects of the earlier Choris culture were emphasized long ago, whereas less emphasis has been given to southern comparisons possible between the chipped stone industry and other artifacts, of the Old Whaling culture or complex reported from Cape Krusenstern and dated somewhat before 1000 B.C. (Giddings and Anderson 1986). With a seaward emphasis and focus on sea mammals, with notched and stemmed points of chipped stone, stone lamps, and rare but present slate, much in the Old Whaling culture is comparable to assemblages from the lower Alaska Peninsula and of the eastern Aleutian Islands (e.g., Dumond 2000b:Figures 2, 3)—assemblages that date no later than the second millennium B.C.

More recently than the time that those potentially southern and Old Whaling elements came to light around Bering Strait, excavations on or around Unalaska Island in the eastern Aleutians revealed not only some generally comparable artifacts, but indicated that local people in the period between 2500 and 5000 B.C. had taken a substantial quantity of what are normally ice-edge fauna—in particular juvenile ringed seals, as well as a few polar bears and walrus, normally not part of the hunting take in that ice-free zone. The conclusion by the zoologists (Crockford 2008; Crockford and Frederick 2007; Davis 2001) was that the southern edge of Bering Sea ice—which reportedly never forms a solid sheet but rather is of “detached fields, floes, and cakes . . . continually kept in motion” (USCGS 1954:489)—had moved far south of its usual limit around the Pribilof Islands, to a position close enough to tempt sea hunters from Unalaska Island.

Although much still remains to be worked out, one can hypothesize that individuals around the eastern Aleutians, newly tempted to pursue ice-edge sea mammals in the third millennium B.C., shifted northward with the floating ice edge as the climate ameliorated and the new prey animals withdrew. Thus by 1500 B.C., a time shortly before the appearance first of the Old Whaling culture and then of the Choris culture, southern open-water hunters were to be found located around Bering Strait in position to accept pottery or anything else the northland and northeast Asia might have to offer.

One can propose that as a result of some such movement the northern and southern characteristics recognized in the Norton culture were intermingled around Bering Strait—several centuries before the appearance of the first sites of a recognizable Norton culture. And when that time came at the close of the Neoglacial period, around 500 B.C. or so, the climate was still in its cooler aspect, and relatively cool temperatures still

tended to enhance the productivity of the ocean edge and its fauna (see e.g., Francis et al. 1998). Following this and a few still-cool centuries during which Norton sites were being widely established, a slow trend of warming set in (Ackerman 1988:66–68; see also Dumond 1969a:Figure 3) that in the longer period of Norton occupation would evidently have encouraged the productivity of the salmon fishery (Finney et al. 2000).

With all that, one might say for Norton culture that the rest of its development is history.

THE ECLIPSE OF NORTON

The end of the Norton period is marked by the appearance of late prehistoric Eskimo remains that have been referred to as Western Thule (e.g., Shaw 1982, 1983) or simply as Thule (e.g., Dumond 1987a). The nature of the sharp transition between the two, however, is still insufficiently understood—a transition in which ceramics changed markedly in paste and form, stone artifacts underwent a revolutionary increase in the proportion of items of polished slate compared to those of chipped basalt, andesite, and chert, and the predominant stone lamps of the Norton-related phases were replaced by lamps of slightly baked clay. “In all, collections of the Brooks River Falls phase and the subsequent Brooks River Camp phase are strikingly different” (Dumond 2011:47).

For the Naknek River region, Dumond (1981:184) described the change as sudden, suggesting that at least some number of new people (in terms of material culture) had arrived from the north bearing artifacts of the Brooks River Camp phase, although at the time he professed to find evidence of continuity between the two, in what seemed a gradual shift in paste and shapes of a few pottery vessels, as well as in certain slate artifacts (classes of which had become increasingly common in the latest Norton phase of the area, designated the Brooks River Falls phase). Even so, his attempts at quantified demonstration of phase relationships tended to show the Brooks River Falls phase most closely similar in inventory not to the initial Thule-tradition Falls phase, but rather to the succeeding Brooks River Bluffs phase (Dumond 1981:187–189). The cause, here, may simply have been that major samples of both Falls and Bluffs phases were derived from the stratified BR5 locality, where Bluffs material was concluded to directly overlie Falls material, with no occupation of the intervening Camp phase present. Thus, any stratigraphic misunderstanding of the site would have resulted in mixing the assemblages of these two (Falls and Bluffs) phases, which are not chronologically adjacent.

An even stronger argument in favor of continuity was made by Shaw (1983) in his report on a 1 × 8 meter trench at the site of Manokinak. Located in the more water-logged Yukon-Kuskokwim delta region, the overall sample was heavily weighted to perishable objects, otherwise rare in excavated Norton assemblages. Even here, however, the Norton assemblage (Component 1, its uppermost floor concluded to date some 900–1200 calibrated years before present) was from strata overlain by a paleosol concluded to represent a hiatus of “less than 400 years” that separated Component 1 from

the “Western Thule”-related Component 2, aged between 775 and 450 calibrated years before present (Shaw 1983:112–113). That is, whatever the integrity of the heavily stratified site and its trench, there is clearly no indication of an immediate transition from one component to the other, thus of change actually in progress.

More recently, a review of the evidence from the Naknek River region (Dumond 2011:46–48) revisited the matter of interpretations from sites such as these of markedly stratified nature. The result is a questioning of earlier conclusions, as well as a recognition that when archaeologists are able to find any artifacts from which it is possible to interpret cultural continuity, they almost inevitably tend to do so.

With this reconsideration, it now seems possible to say only that the change between late Norton culture and early Western Thule culture or the like was relatively sudden and essentially complete in terms of the bulk of the material toolkit. In the Naknek region this occurred at a calendar date sometime around A.D. 1050 (Dumond 2011:Tables 4.1, 5.2), and presumably dates about the same throughout the rest of the southernmost region of Norton culture.

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CHAPTER 17

THE OLD BERING SEA FLORESCENCE ABOUT BERING STRAIT

OWEN K. MASON

As early as 400–250 B.C., a radical conceptual and socioeconomic breakthrough occurred in the Bering Strait region, as virtually every artifact was overlain with formalized motifs (Wardwell 1986) and as figural representations were crafted, of both animals and humans (Figure 17.1). This breakthrough was due either to internal societal dynamics or, alternatively, was an artifact of taphonomic factors, such as fortuitous site preservation. The elaboration of art is linked with a high degree of sedentism, developing within a polarity of everyday and specialized funerary art (*contra* McGhee 1976:210). Art appears earliest along the northern Alaska coast during the Norton phase and is spare and linear, apparently decorative in function, as recovered at Battle Rock, north of Cape Krusenstern (Giddings and Anderson 1986; Mason, this volume, chapter 20). Some archaeologists observe affinities, possibly a common heritage, and compare these artworks to the earliest Old Bering Sea (OBS) art of Uelen and Okvik (Rudenko 1961:27, 169, 176–177; Larsen 1968). A radical shift occurs as figural art (Figure 17.1) developed in the Okvik and Old Bering cultures (Arutiunov and Fitzhugh 1988; Collins 1969–1970; McGhee 1976; Rainey 1941); common subjects include transformed animal faces, the mother and child (“madonnas”) (Collins 1971; Rainey 1941), as well as submissive males (Arutiunov and Sergeev 2006 [1975]:127; Levin 1964:Figure 14). Ethnographic parallels indicate that motifs represent cosmologies (Arutiunov 2009), sympathetic hunting magic, “honoring the cosmos,” and providing exemplary vision (Fitzhugh 2009b:165) or prophylaxis to ward off evil (McGhee 1976:211).

The linkage between specific motifs and ethnicity remains conjectural, due to poor dating controls and contextual uncertainties, especially from legacy data (Bandi and Blumer 2002; Blumer 2002; Dumond 2002:353). A notable exception is Okvik Hillside House 5 (Blumer 2002; Maier 2008 [1972]). Nonetheless, the motifs undeniably recur in systematic formats (Figure 17.2), although curation and reuse certainly complicate

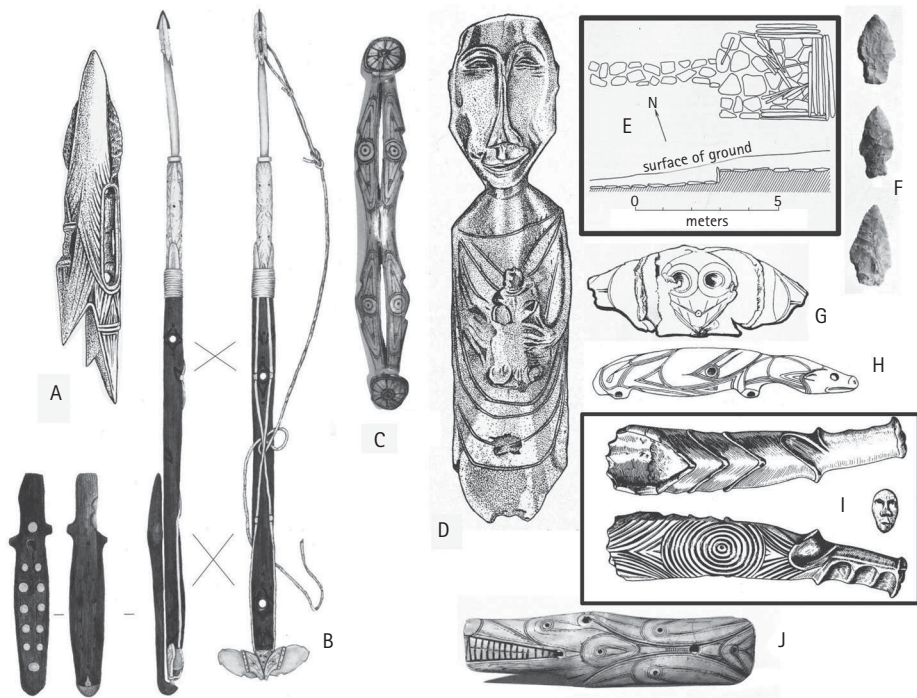


FIGURE 17.1 Okvik and Old Bering Sea technology, marked by innovations in figural representation and the imperative to inscribe even everyday objects. (a) Atlatl (lower) and spear technology, with harpoon, foreshaft and socket-piece assemblage, spear and winged object counterweight at distal end, L 60 cm (after Fitzhugh et al. 2009:163); (b) inset, upper left: decorated harpoon head, OBS I: collected at Barrow by Stefánsson, L 10 cm (Wissler 1916:Figure 9); (c) pail or bag handle, OBS II style: Little Diomed Island, L 18 cm (after Wardwell 1986:76); (d) Okvik “Madonna,” L 16.7 cm (after Rainey 1941:523); (e) plan of Okvik House 2: Hillside site (after Collins 1937:39); (f) bifaces: Okvik Hillside site, uppermost: L, 6 cm (Collins 1937:Plate 40:2, 7, 12); (g) winged object, L 8 cm; (h) polar bear effigy: Okvik Hillside site, L 9 cm (Collins 1937:42, 49); (i) shaman’s ivory pottery paddle (three views), OBS motifs: Ekven, Burial 146, L ca. 10cm (Arutiunov and Sergeev 2006 [1975]:152); (j) ornament of toothy predator: Mayughaaq, L 11.5 cm (after Fitzhugh et al. 2009:171).

Image compiled by Owen Mason

any data derived from cemeteries (Mason 1998). Motifs possibly served as “categories of ascription” (Barth 1969), defining social groups (cf. discussion in Mason 1998), reflecting boundary markers—or at least a commonly held cosmic perspective. The revolutionary and revelatory character of OBS, and by extension Ipiutak (Mason, this volume, chapter 20), art may “qualif[y] it among the great achievements of prehistoric culture” (Arutiunov 2009:126). As Arutiunov continues, Old Bering Sea aestheticism is also remarkable in its social setting. Foremost, with a surfeit of ivory, the material enforced a three-dimensional perspective, with its carving conducted within a murky indoor, oil-lit darkness, which fostered a tactile approach—a factor also crucial in its

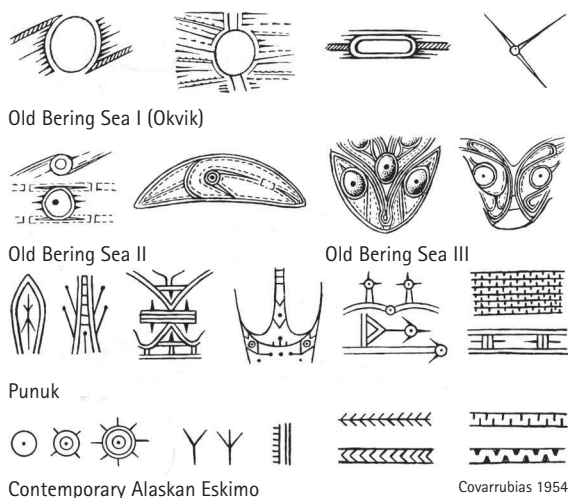


FIGURE 17.2 Principal motifs that define the various “cultures” across Bering Strait, termed by Collins (1937:47, 82) Old Bering Sea and Punuk (reproduced from Fitzhugh and Crowell 1988:123). Fitzhugh (2009) provides additional definitions.

Image from Fitzhugh and Crowell 1988:123

appreciation (Arutiunov 2009:128). The symmetrical and precise draftsmanship is so profound, it is comparable to a “musical séance,” so that “the carver’s hand . . . performs a kind of rhythmic dance . . . with the design a musical score,” commented the illustrator M. Mechev to Arutiunov (2009:133). The intermingling of styles within a single grave implies that OBS craftsmen worked between styles or appropriated neighboring styles, a sort of “ornamental bilingualism” (Arutiunov 2009:132)—if curation for war trophies, marital gifts, or heirlooms can be distinguished (Mason 2009a:86–87).

ORIGINS OF COMPLEX SOCIETIES IN WESTERN ALASKA: WALRUS OR WHALES

Archaeologists have long appreciated the disquieting paradox that western Alaska witnessed its most complex cultural repertoire at its earliest sea-mammal hunting settlements, that it arose *ex nihilo*, at least in the explosive nature of a very profound figurative art inscribed on walrus ivory. Much attention has focused on the art, much of it mortuary, to the exclusion of everyday objects such as lithics or ceramics, or of archaeozoological data sets. Two marine mammals complete for prime-mover status in Bering Strait: the walrus and the bowhead whale. The bowhead typically grabs intellectual and cultural enthusiasm—its girth metaphorically overawing its smaller rival. That notwithstanding, the onset of sedentary and complex societies closely tracks the distribution of walrus haul-outs, Collins (1940:549–550) hypothesized, possibly a consequence of the

multifarious technological applications (cordage, food, skin boat coverings, ivory hunting equipment) of this seasonally abundant behemoth, well articulated by Arutiunov and Sergeev (2006 [1975:86–87]). By its cooperative hunting, walrusing had social ramifications that intensified kin relationships and led to specialized, often gendered, work groups (Ellanna 1988:77; Hill 2011:55). The taking of walrus would seem a likely precursor to tackling the larger leviathan (Arutiunov and Sergeev 2006 [1975]:86–87). Was the walrus, not the bountiful bowhead, then, the principal catalyst for complexity? This possibility was elaborated by Hill (2011:56, 58), who cautions against the whale “fetishization” common among many archaeologists (cf. Sheehan 1985). Unfortunately, present data do not support a priority for walrus over whale hunting in the Bering Strait region. The absence of symbolism such as labretifery, with its echoes of the walrus anatomy, although originating 3,000 years ago in southern Alaska (Steffian and Saltonstall 2001), does not appear in Bering Strait until relatively late (Dumond 2009b).

The technological descent of walrus hunters may be discernible in the use of shouldered and notched bifaces (Figure 17.1). In deep time, ca. 3000 B.C., on the prominent haul-out on Round Island in Bristol Bay, southern Alaska, walrus-interested people employed a notched bifacial technology (Schaaf et al. 2007:64–65) similar to that at nearby Security Cove (Ackerman 1998). About 1,000 years later, similar side- and corner-notched bifaces were fashioned by the Old Whaling culture (Giddings and Anderson 1986:Plates 143, 146, 151–154), as well as on Wrangel Island at Devil’s Gorge (Dikov 1988), at the northern limit of walrus. This coastal phenomenon was christened the “Chukchi Archaic” by Mason and Gerlach (1995)—an attribution disputed by Dumond (2000:33–34). In the centuries after Old Whaling declined, after 900 B.C., notched bifaces were in use at Iyatayet Norton with characteristics that Giddings (1964:164, Plate 50) noted “stand somewhat apart from other types . . . [either] erratic products of local flint knappers or rare forms that may . . . prove to have comparative value.” A final line of descent is the notched biface in early OBS or Okvik sites (Figure 17.1) that resemble the coastal “Archaic” repertoire: for example, at the Ekven double burial 130 (Arutiunov and Sergeev 2006 [1975]:Figure 61:15, 16) and at Okvik (Collins 1937:Plate 40; Maier 2008 [1972]:Plate 42).

EARLY OKVIK AND OLD BERING SEA CULTURES, CA. 200 B.C. TO A.D. 400

The earliest phases of Bering Strait prehistory are poorly dated and equivocal (Figure 17.3). While a handful of ^{14}C ages from Chukotka sites may establish the antiquity of OBS in the first millennium B.C., the preponderance of ^{14}C ages follow A.D. 1, or are no earlier than 200 B.C. (Bronshstein, et al., this volume, chapter 19; Dinesman et al. 1999). Long considered the earliest OBS phase (I) (Collins 1937: 36–47), the Okvik culture is increasingly better documented (Bandi and Blumer 2002; Dumond 2008:268, 277). The sample of harpoon

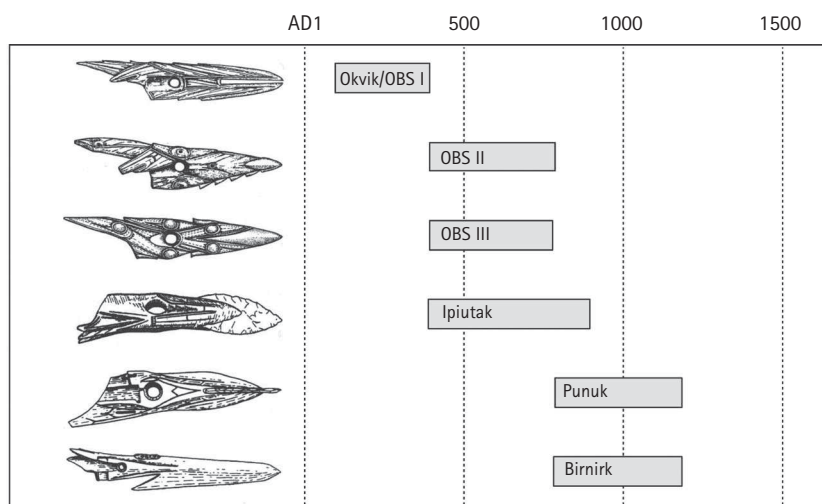


FIGURE 17.3 Range of radiocarbon ages associated with diagnostic harpoon heads from St. Lawrence Island (Dumond 2009:74, modifying Blumer 2002:92).

Illustration by John Darwent

heads at Okvik is large ($n = 217$), despite only generalized midden provenience (Dumond 2008:270; Rainey 1941:476). Okvik motifs are discontinuous, simple and spare lines, considered “primitive;” therefore, following a conventional evolutionary model, the Okvik style should precede the more complex, accomplished OBS or Ipiutak designs (Arutiunov and Bronshtein 1985; Collins 1929, 1937, 1940; Giddings 1960; Van Pelt 2008 [1975]).

Okvik settlements are few and restricted to Uelen, north of Cape Dezhneva (Chukotka’s East Cape), St. Lawrence Island, and the Diomed Islands. The Okvik graves at Uelen, discovered in the late 1940s by Rudenko (1961) and further tested in 1958 (Levin 1964), led to Larsen’s (1968) coinage of “Uelen-Okvik,” a variety of Norton culture, that emphasized its ceramics rather than slate or coarsely flaked bifaces. The Okvik occupation on the Diomedes is known from poorly provenienced objects acquired in the 1920s (Jenness 1928; Morrison 1991). The two most significant Okvik sites lie on opposite ends of St. Lawrence Island (Collins 1937; Dumond 1998, 2008; Rainey 1941) and were well positioned to dispatch migrating or hauled-out walrus or to secure a bounty of driftwood, as at Southeast Cape. The poorly dated Okvik site on the Punuk Islands has suffered for a hundred years from the predations of its original excavators and several generations of local diggers. Although no houses, and little wood, were encountered at Okvik, the artifact-laden 1.8 m thick midden contained “large numbers of walrus, seal and bird bones”—preserving the farthest inland margin of an eroded site (Rainey 1941:468). Many unworked walrus skulls and tusks underlie the Okvik midden, within sterile beach sand “rest[ing] on dense [marine?] clay or gravel” (Rainey 1941:468), as at Kukulik mound, supporting the supposition that visits to walrus haul-outs foreshadowed sedentism in Bering Strait. The dating of the Okvik site is early, based on assays from poorly provenienced ivory artifacts that calibrate between A.D. 16 and 234 with

the ivory corrected for marine carbon effects (Blumer 2002). The best-dated and documented early Okvik settlement in Alaska lies on the lower slopes of the Hillside near Sivuqaq, Northwest Cape on St. Lawrence Island (Blumer and Bandi 2002; Collins 1937:36–52; Dumond 2008:294–298 Maier 2008 [1972]; Van Pelt 2008 [1975]). Hillside has three oval rock-walled houses, differing from squarish OBS houses (cf Figure 17.1) and two rock-slab activity areas, termed houses, one with 1.5 m long wood supports (Blumer and Bandi 2002:46). The Okvik houses were 12–16 m², space sufficient only for five to seven people; another 5.5 m diameter slab round floor of 24 m² offered space for 10 additional people. Assuming contemporaneity, the Okvik community included 35 to 40 people. For its dating, the Okvik settlement benefits from more than 20 assays on several materials, including spruce, willow, alder, grass, and ivory (Blumer 2002:69, 101; Dumond 1998:133, 2008:301). The most reliable short-lived grasses establish that the earliest Okvik occupation, within 1σ, occurred between A.D. 216 and 338 and/or A.D. 350 and 425 (Dumond 2008:301). Minimally, the Hillside Okvik houses were contemporaneous within A.D. 200 to 450, although several were possibly reoccupied, or maintained, for several centuries later, to ca. A.D. 600 (Dumond 2008:300). Okvik at Hillside likely approximates the scale of an early first-millennium Bering Strait community, but the number and proximity of its extraregional neighbors remain uncertain.

Household economics and inventories are known in some measure for Okvik (Figure 17.1). Hillside House 5 offers the “most representative . . . Okvik style found in a dwelling context” (Blumer 2002:87) and was occupied between A.D. 175 and 420 (Bandi and Blumer 2002:70). Its inventory, fully described by Maier (2008 [1972]) includes eight decorated harpoon heads, float nozzle plugs, model kayaks, and boat parts, as well as several human figurines. The Okvik subsistence base at the Hillside, however, can be hypothesized only from the qualitative assessments of early excavators; the “many strips of baleen” below roof fall in House 3 may reflect whaling (Rainey 1941:471), as would the whale skulls used in construction. Further, the well-attested technological uses of walrus imply its hunting was essential to the Okvik economy, as does the midden that “mainly included walrus and seal bones; also bird, dog and a few fish bones” (Collins 1937:37). The prevailing view is that any whaling was “incidental”—“baleen was relatively scarce,” as were whalebones (Collins 1937:170–171).

The Okvik culture differs from others in that its definition depends less on mortuary assemblages; of those few, 11 were at Uelen (Levin 1964), all are undated, and one was at Ekven (Bronshtein and Plumet 1995). Okvik grave inventories at Uelen were dominated by sparingly decorated spurred or trifurcate harpoon heads; the richest being skin-covered double Burial 22, lying on a wood floor, that contained more than 50 objects: 17 Okvik harpoon heads, a foreshaft, five other bone carvings, an ice pick, slate points (Arutiunov and Sergeev 2006 [1969:50, 93, 94; Levin 1964:308]). Only Ekven Okvik Burial 63, is dated, falling between A.D. 16 and 234, but it is possibly several centuries younger (Dumond 2008:301).

Although walrusing and whaling may co-occur with the onset of the small Okvik hamlet at the Hillside, possibly evidence of sedentism, the oldest burials at the adjacent (<50 m distant) Mayughaaq cemetery preceded its occupation, during the last centuries B.C.

(Blumer 2002:104) Thus, an older occupation may underlie Mayughaaq. On a regional scale, the prehistoric Bering Strait during the last centuries B.C. was a Paleoeskimo community “closely affiliated OBS tribes and a less numerous OKV [Okvik] ethnocultural entity” (Arutiunov and Bronshtein 1985:21). Some of the OBS group(s) “migrate[ed]” to Alaska and “participate[d] in the formation of the Ipiutak ethnic entity”—“migrated” concealing perhaps a more sinister war-like intent (Mason 1998).

OLD BERING SEA CULTURE

Cultural Diagnosta

During the last centuries B.C., a revolutionary shift in artistic production and material culture occurs along the coasts of Chukotka; a phenomenon marked by increased social complexity and hunting success (cf. Fitzhugh 2009a:90–91, for a trait list). Several circumstances produced the aesthetic florescence that was unprecedented and never matched—so much so that Collins (1940:583) viewed all of subsequent prehistory as a “simplification,” *devolution*, from OBS. The figurative human and animals, as well as abstract motifs applied on diverse objects (Figure 17.1), enable the reconstruction of cosmological beliefs, typically grounded in ethnographic analogy (Arutiunov 2009; Bronshtein et al. 1997). Since the unappreciated discovery of an isolated OBS harpoon head at Utqiagvik, modern Barrow, a century ago (Wissler 1919:410–411), subsequent discoveries about Bering Strait reveal that the OBS culture was restricted to the Chukotkan littoral and adjacent islands, although Mason (1998; this volume, chapter 20) argues that Ipiutak on the Alaskan mainland were OBS allies and, likely, of common Yupik ethnicity, presumably ancestors of modern St. Lawrence Islanders.

Walrusing, whaling, and sealing were practiced with both hand-thrust spears and throwing-board (atlatl) propulsion that occasioned a complex array of a dozen interacting ivory, wood, and stone objects: an open- or closed-socket toggling harpoon head, with lithic insets, foreshaft, socket-piece, 1 m long wood shaft, a counterweight, and the wooden throwing board impregnated with various ivory pegs and dowels (Arutiunov 2009). The sample of harpoon heads is robust: 417 from near Gambell, divided into 36 types (Collins 1937), 183 at Uelen and more than 400 at Ekven (Arutiunov and Sergeev 2006 [1975]:89), within 47 types and five groups that correspond to cultural groupings and general evolutionary trends similar to a cladistic analysis (Arutiunov and Sergeev 2006 [1969]:69–76). The drag-float apparatus was employed in OBS as early as the Okvik culture (Bandi and Blumer 2002:42; Collins 1937:Plate 30; Maier 2008 [1972]:55–56). The variety of toggling harpoon head types, both closed and open, served both OBS people and archaeologists well. A crucial distinction is the parallel or perpendicular orientation of the slate endblade (“X” or “Y”); based on the physics of airborne twirling line. Arutiunov and Sergeev (1972:308) argued that the two forms reflected contrastive strategies either for heavy ice or open water, with the Y form developed earlier and used in open water, south of Bering Strait, at Ekven and St. Lawrence Island.

Transportation on sea and ice is known in outline for OBS culture. Maritime craft were also crucial and complex, likely the product of a long tradition, poorly documented in the archaeological record, that relied on the kayak and very likely the umiaq—based on the discovery of a keel piece and several toys (Collins 1937:158, Plates 46:14, 59), one at Hillside (Bandi and Blumer 2002:42). In addition to the carved wood frame, fastened by walrus sinew, and an outer skin of walrus, both watercraft required many accessories, such as paddles, seats, and so on. Ivory kayak models also occur at Ekven in Burial 10/11 (Arutiunov and Sergeev 2006 [1975]:16). Driftwood was crucial, possibly determinative, for boat manufacture and, not accidentally, sites track wood concentration points such as Southeast Cape. The use of the sail is problematic, as is the role of the umiaq in the earliest phases of OBS. The impact of maritime craft on social interaction, pacific and martial, was considerable, although the open-water long-distance capabilities of skin boats may be only several days, owing to its potential to rot (Stefánsson 1913:106). For transport by ice, ivory runners and shoes are evidence for ice hauling by sled (Collins 1937:156–157, Plate 44, 45), but the participation of dogs is uncertain since specialized tools (e.g., whip handles or traces) are absent. Dog bones were abundant at OBS sites and were from small breeds, kept possibly for dietary and religious (i.e., sacrificial) purposes, as inferred by Geist and Rainey (1936:355–357) and by Collins (1937:249, 1940:551) from punctured skulls.

Woodworking was an essential component of the OBS technological repertoire, with wood-handled adzes, wood bases for baleen vessels, and wood dishes (Collins 1937:169–170). Wood was necessary for drying racks, drum rims, and as frames for maritime craft, for bows, as shafts for spears and arrows, hats and snow goggles, and so on. Wood, ivory, and walrus scapulae served as shovels, mattocks, and picks, especially for snow removal (Collins 1937:160–162), likely in digging graves and house foundations, if not fortifications. Fire-making equipment relied on wood, particularly the bow-drill and rest (Collins 1937:162–163, and, of course, wood fires cooked the ceramics. Wood was crucial for hunting equipment in spears, bows, and arrows, although the types of bow are less well known and, apparently, the sinew-backed bow was not in use (Collins 1937:134).

Bone served as critical hunting accessories, as well. Distinctively barbed antler arrow heads closely resemble those of both Ipiutak and Birnirk cultures, and Maschner (2000) and Mason (1998, 2006) have argued for their use in warfare—especially on insular locations that lack large ungulates. Bird darts, deployed by the wooden throwing board, were complex objects of several ivory multibarbed prongs (Collins 1937:131). Similar barbed prongs were also used for spearing fish, with equipment sufficiently elaborate that Collins (1937:133, 140–143) distinguished eight types of plummet-shaped fish-line sinkers. Fishing paraphernalia included fishing line, shuttles for crafting baleen nets, and fish hooks (Collins 1937:172). Scraping and rubbing tools include whetstones and some used for skins, as well as fat scrapers and wood-handled slate ulus for cutting (Collins 1937:164–166).

Container technology included baleen vessels, as early as Okvik at the Hillside site (Collins 1937:Plate 53:1) as well as a fairly developed ceramic technology, generally produced as a low-fire “crud ware,” primarily used for lamps and bowls. OBS ceramics differ from those on the Alaska mainland: “both vessel thickness and the decoration are outside the range of Norton specimens” (Dumond 1969:24). Pottery production testifies to

the availability of driftwood on treeless coasts, although no specialized OBS pot-firing areas or kilns are documented.

Lithic technology relied on chert for side- and corner- or shoulder-notched spear points, as well as for drills and graters, side- and endscrapers. Slate grinding produced a variety of cutting tools: the ulu, and harpoon endblades. To some archaeologists, the origin of slate technology is useful in defining prehistoric evolution; slate grinding was first developed in the Gulf of Alaska during Ocean Bay II, about 4,000 years ago (Clark 1979). If slate technology is a proxy for the directionality of cultural influence then one might expect its ultimate ancestry in Ocean Bay II and hence a southern origin for OBS (cf. Crockford 2008). However, the possibility of independent invention should not be excluded out of hand, considering the rough flaking of some OBS slate points and the “crude” appearance of many other slate pieces. The use of iron and obsidian for cutting or engraving indicates the distant reach of extraregional exchange systems (McCartney 1988; Mason 1998). Evidence of iron use by OBS peoples is restricted to two burins from Ekven and one from Uelen (Gusev and Zhilin 2002:142; Levin and Sergeev 1964) and two large pieces recovered in 1980 by diggers from a burial near Mayughaaq (Bandi and Blumer 2004b:161, 166). Iron burins also occur in Ipiutak (Bowers 2009; Larsen and Rainey 1948) and in Birnirk (Ford 1959). Obsidian was obtained from the Krasnoye Lake source, up the Anadyr River in Chukotka (Rasic, this volume, chapter 5), an instance that reveals the onset of the penetration of the world system into Bering Strait.

The documentation of OBS clothing and body accoutrement is restricted to a few shreds of skin clothing, buttons, brow bands, and snow goggles (Collins 1937:177), but clothing is thought to prefigure modern workmanship. All were essential climatic adaptations, especially the snow goggles and the (likely) wooden hats. Fortuitous circumstances have preserved a series of tattoos on a frozen body discovered at Kiyalighaaq (Southeast Cape, St. Lawrence Island) in 1972 (Smith and Zimmerman 1975). The linear tattoos resemble OBS designs and, based on two ^{14}C assays (averaged at 1574 ± 56 B.P.), were inscribed between A.D. 880 and 1175, applying the 188 ± 27 year correction of Savinetsky and Khassanov (2004). The decorative system of OBS tattoos may have an ancient and complex pedigree, linked to East Asian homeopathy and the prophylactic effects against evil spirits (Krutak 2009:191). The human body served as an accessory canvas, similar to objects of the hunt in requiring preventative figuration and decoration.

ARCHITECTURAL HISTORY FROM OLD BERING SEA TO PUNUK

Archaeological documentation of OBS houses is comparatively infrequent; notable are several by Collins (1937:37–40, 68–76) at Hillside and Mayughaaq, and Bandi and Bürgi (1972) in the vicinity of Sivuqaq, as well as a dozen houses excavated across Chukotka (Arutiunov and Sergeev 2006 [1969]:37; Dikov 2003 [1977]:166–168, 191–193; Gusev et al.

1999), many tested in the late 1940s by Rudenko (1961:63, 66–67, 71, 112–113. A prototypical OBS house, for example, House 4 at Mayughaaq (Collins 1937:260) was

small, square to rectangular; semisubterranean; stone floors, walls of horizontally laid small timbers with occasional whale jaws, held in place by wood and bone stakes; form of roof unknown, long entrance passage lower than floor of house, with stone floor and walls and timbered roof.

The small sample of excavated houses precludes meaningful statistics, St. Lawrence OBS houses had only a single room of between 3 and 6 m diameter, enclosing between 9 m² and more than 36 m²—space sufficient, respectively, for four and 15 people (Figure 17.1).

In Chukotka, several OBS houses were excavated near Cape Dezhneva by Gusev et al. (1999): Kaniskak House 1 had a whalebone superstructure that enclosed two rooms; both 9 m², “with [a] big storage recess” (Gusev et al. 1999:360). These three OBS houses near Dezhnevo circumscribe sufficient space for only 30 people. While more artifacts were found outside than inside, the interior assemblage included arrowheads, bow guards, wound plugs, fish hooks, and OBS harpoon heads and sled runners (Gusev et al. 1999:363). At Inchoun, adjacent a walrus haul-out northwest of Cape Dezhneva, a sizable multiroom whale-bone house was partially excavated by Dikov (2003 [1977]:166–168). Within a central chamber of 10 m diameter, ceramics, slate knives, arrows, spears, and adzes were associated with walrus tusk, and a stone box hearth and downslope; the midden was “very saturated,” containing OBS harpoon heads and a winged object.

Distribution

The distinctive OBS culture is extensive on both north and south Chukotka coasts (Ackerman 1984; Dikov 2003 [1977]; Rudenko 1961), on the Diomedes, and on St. Lawrence Island, but offers only a shadowy appearance on the Alaska mainland from Norton Sound (Mason et al. 2007) to Point Barrow (Carter 1966). Ironically, very little is known from the two locales that produced the first finds (Figure 17.1) of an “archaic” Bering Sea culture: Utqiagvik (Wissler 1919) and the Diomed Islands (Jenness 1928). At the Birnirk site, the interpenetration of occupation layers containing both OBS and Birnirk objects was apparent to Carter (1966:25), although no supporting stratigraphic data are available. Virtually no OBS site lies more than 1 km from the sea, a sign surely of an extreme maritime specialization, with quite a few OBS sites on or near walrus haul-outs: e.g., Okvik, Kukulik, Inchoun, Seshan, and Koliuchin Island. OBS sites are spaced regularly along the north Chukotka shore, at Vankarem, Seshan (Dikov 2011 [1968]), with six houses at Cape Dzhenretlen, and to the north end of Koliuchin Island (Dikov 2003 [1977]:183, 185). Cape Dezhneva had twin settlements: one facing north, at Uelen barrier island, and one facing south at Ekven bluff and lagoon. The OBS occupation of

eastern Chukotka, along Anadyr Strait, across from St. Lawrence Island, was concentrated along 20 km of low bluffs, with at least four significant sites: Yandogai, Nuniamo, Chini (101 graves and but nine depressions; Dikov 2002 [1974]), and Emynytyn (with 30 burials in its three graveyards; Dikov 2003 [1977]:147–164). The first Emynytyn cemetery, with its six rock-enclosed graves, contained winged objects, dual-holed OBS harpoon heads, as well as both ground-slate and chipped stone projectile points. The clustering of OBS sites on the south Chukotka coast conferred numerous social advantages (Gusev et al. 1999:356; Whitridge 1999:122). By using kayaks or umiaq, travel between settlements involved only a few hours, allowing regional cooperation and thereby increasing the marriage pool, adding to whaling or walrusing crew size or to recruiting war parties.

At least five sizable OBS communities occur on St. Lawrence Island: three in the northwest at Sivuqaq (Mayughaaq), and environs (Merughta and Kitnepaluk) and two on the southeast (Okvik and Kiyalighaaq). By contrast, the OBS presence at Kukulik, on the central region of the north shore, was fairly minimal, as Geist and Rainey (1936:230–231) admitted—possibly it was not even an OBS settlement. While scientific excavations at Sivuqaq have produced few elaborate OBS burials (Bandi 1984; Staley and Mason 2004), the offerings to art dealers in the last 20 years suggest that subsistence diggers have tapped a vein not evident to previous archaeologists (cf. Bandi and Blumer 2004a).

Several other localities offer limited evidence of OBS; the rocky interstices of the Diomed Islands yielded a number of dramatic finds to Jenness (1928), to Collins, and later collectors (Wardwell 1986). A whaling harpoon head from a purportedly mixed Singauruk assemblage, north of Wales, produced several OBS objects, of uncertain age and context (Giddings and Anderson 1986:104, Plate 61p). The easternmost OBS decorated object is from Golovnin Bay, consisting of a browband from the sixth century A.D. qargi of Qitchauvik (Mason et al. 2007:Plate XXIII). Outside of the problematic Utqiagvik and Birnirk settings, several OBS objects, including a roughed-out winged object, also occur within a few houses at Ipiutak Point Hope; the firmest evidence is a harpoon head with OBS decorations from House 69 (Larsen and Rainey 1948:73) dated to A.D. 540–770 (K-2746) (Mason 2006).

Chronology

Chronometric preferences differ across Bering Strait; Russian researchers have favored using marine-mammal and human bone for ^{14}C assays—materials that incorporate marine carbon older than the atmospheric ^{14}C . Hence, marine ^{14}C ages require a correction factor (ΔR) based on paired samples. A 400–500-year offset was first proposed by Mason and Ludwig (1990:364–365), followed by Dyke et al. (1996), who inferred a ca. 200-year correction for surface-feeding bowhead whales. Dumond and Griffin (2002) incorporated additional data, generating corrections for benthic feeding organisms (walrus, gray whales): 461 ± 40 and 731 ± 100 years. Khassanov and Savinetsky (2006:201) used paired assays from Siberian sites, proposing a ΔR of 188 ± 27 , with

variability: sea-mammal bones offset by 607 ± 65 years, whale bone by 318 ± 25 years, and human bone by 88 ± 102 years.

Knowledge of the initial stages of the evolution of OBS culture remains imprecise and largely inferential, with entrenched opinions about the priority and/or contemporaneity of Okvik or OBS (cf. Dumond 2008). The antiquity of OBS is imperfectly established; for example, at its northwest, an OBS site at Seshan remains among the earliest, with an age on charcoal 417 B.C. to A.D. 25—whole wood biases may be suspected (Gerlach and Mason 1992). Farther to the northwest, Koliuchin Island (site 146) (Dikov 2003 [1977]:183, 185) was occupied much later, A.D. 690 to 850.

Thirty calibrated ^{14}C ages from the Ekven cemetery (a 10 percent sample) reveal an unexpectedly younger occupation—wholly within the first millennium A.D. (Dinesman et al. 1999:127–128), applying the 188 ± 27 year correction of Khassanov and Savinetsky (2006:201). The earliest OBS burials possibly occur within the late third century A.D.: Burial 291 was emplaced A.D. 266–620, as contemporaneous with Burials 285b and 121, respectively A.D. 264–654 and A.D. 241–679. Many of the remaining graves cluster more clearly within the late seventh to ninth centuries A.D., and an equal number were younger than A.D. 1000. A similar first-millennium chronology is replicated in OBS architecture, although it is limited to only five houses in Chukotka and St. Lawrence Island. In eastern Chukotka, the earliest excavated OBS house is at Ninlupak between A.D. 280 and 540, with possible contemporaneity with the whale-bone house at Kaniskak dated between A.D. 400 and 855 (Gusev et al. 1999). Stone-floored House 4 at Mayughaaq was occupied between AD 400 and 800 but was intruded by the overlying walrus-bone-walled House 3 (both excavated by Collins 1937), also possibly contemporaneous or younger (Blumer 2002). In total, calibration and correction suggest that OBS is no older than Okvik and is contemporaneous with Ipiutak, although it may have persisted much longer.

The further refinement of OBS chronology into separate phases, OBS II and OBS III, is only preliminary, considering the ambiguity of ^{14}C ages from Ekven graves. For Alaska, the most comprehensive effort in OBS chronometry is that of Blumer (2002:79–92), who assembled 91 ^{14}C ages from St. Lawrence Island and proposed: OBS I and Okvik are as early as 50 B.C., while OBS II and III center between A.D. 400 and 450 (Blumer 2002:79), although the full range for the styles is twice as long, with OBS II in contexts as recent as A.D. 1300. Blumer's synthesis is employed by Dumond (2009) and Fitzhugh (2009a) to assign OBS I to between A.D. 1 and 400; OBS II and III between A.D. 400–800 (Figure 17.2).

Subsistence of Old Bering Sea: The Question of Whaling

The economy of OBS cultures focused on sea-mammal hunting, supplemented by a variety of birds and fish, and possibly dogs. Although early researchers failed to assemble adequate analytical samples, qualitative impressions, based on ethnographic analogy, sufficed for Collins (1937:248) to emphasize that “the abundance of walrus bones in

all of the middens and the great number of implements made of ivory show” its “prime importance . . . in the economy of the St. Lawrence Island Eskimos.” The subsistence contribution of walrus was very significant on St. Lawrence Island, Okvik, and OBS and although its priority in subsistence remains hypothetical (Hill 2011:51). The contemporaneous Ipiutak people on the Alaska mainland were also walrus-hunting specialists and craft workers, adversaries, and trade partners (Mason 1998, 2006, 2009a, this volume, chapter 18). On Chukotka, walrus taking has an uneven history, with apparently low hunting success until well after the OBS culture had faded (Dinesman et al. 1999:Figure 4.8, 8.5). On St. Lawrence Island, seals were second in the diet, with birds of considerable interest, and dogs were probably eaten, considering their abundance and cracked parietals, although cod was the only fish identified (Collins 1937:256). Early researchers used several proxies for whaling success, notably, the frequency of whale bones and baleen. The abundance of baleen increases dramatically during Punuk at Mayughaaq as opposed to its scarcity at the earlier Hillside site (Collins 1937:170ff). Whaling harpoon heads are notoriously rare, often limited to the late prehistoric (Rudenko 1961:121), and this led Collins (1937:253) to conclude that “whales do not seem to have been hunted during the Old Bering Sea period,” although the volume of baleen implies “that [whales] were obtained in some way.” Might this be trade or exchange with Chukchi Peninsula whalers? The accidental occurrence of baleen was also invoked by Collins (1937:217)—the bowheads on the beach at Sivuqaq were just collateral damage, the discards of killer whales.

Whaling, very likely, commenced with the onset of the OBS culture, based on the archaeozoological data assembled by Dinesman et al. (1999:62–63) from “whales located in ruins of dwellings” and on eroding bluffs, with few precise details related to specific or dated house or mortuary assemblages. The dating ($n = 80$) of walrus and whale bone (gray and bowhead) offers a rough estimate on the onset of walrusing and whaling at Ekven (Dinesman et al. 1999:127–129; Gusev et al. 1999:359; Savinetsky and Khasanov 2004). Only two ^{14}C assays predate 2000 ^{14}C yr B.P., implying only that bowhead whaling was practiced no earlier: 2683 ± 149 B.P. (IEMA-829) and 2166 ± 68 B.P. (IEMA-860), calibrated between 622 B.C. and A.D. 162, and A.D. 245–588. The gray whale was pursued possibly as early, although similar ^{14}C ages require a larger correction because of its bottom feeding proclivities. The contemporaneity of the dated burials with the midden-disposed whale bone (Dinesman et al. 1999:127–128) implies a causal linkage between a surplus generated by whaling and the elaboration and development of complexity (Mason 1998).

The late Holocene history of Chukotka whaling was further synthesized and dated by Savinetsky and Khasanov (2004), using the data from Dinesman et al. (1999), and shows variable success in taking bowhead and gray whales. Whaling at Ekven initially spiked ca. A.D. 600 but was sustained and successful only *after* ca. A.D. 1200, continuing at a high level into the Little Ice Age, with bowhead whaling remaining successful until the late eighteenth century. The northern Chegitun localities, very likely Birnirk in ethnicity (cf. Mason, this volume, chapter 20) varied between a spike in gray whale-hunting ca. A.D. 1000 and an early Little Ice Age bowhead peak ca. A.D. 1450. A generation ago,

using then-extant chronology, Krupnik (1993:187, 191) argued that warming (“ca. [A.D.] 800–900”) fostered Punuk whaling, and Little Ice Age “cooling” led to its “demise” during late Thule. The redating from Chukotka supports an opposite conclusion, which emphasizes that increased upwelling and productivity are associated with intensified meridional circulation during the Little Ice Age, as Mason and Barber (2003) proposed, “Cooler was better.”

Authenticating whaling in Bering Strait has involved the measured inference of whale size and deriving demographic profiles from bowhead whale bones ($n = 2844$) in the vicinity of archaeological sites (Savelle and McCartney 2003:169). Based on eastern Arctic parallels, prehistoric hunting can be inferred because precontact technology could only take down a whale that was between 7 and 10 m in length. Unfortunately, no chronometric or contextual data are associated with the on-the-ground whale-bone measurements—hence, it cannot be definitively said whether OBS or Punuk people were responsible for the 157 measured bones analyzed by Savelle and McCartney (2003).

THE MORTUARY DATABASE

The number of OBS graves, both excavated and inferred, is staggering but is probably misleading because of the advantages of permafrost preservation. The total count of excavated burials approaches 1000; with 300 from Ekven, 150 from Uelen, 300 from Mayughaaq, 100 from Kitnepaluk, 100 from Chini, with a handful from other Chukotkan sites. The physical anthropology of OBS populations has witnessed examinations of paleopathology at Uelen (Lebedinskaya 2006 [1969]) and St. Lawrence Island (Arnaud and Arnaud 2004) while several researchers have studied the teeth of Uelen (Zubov 2006 [1969]) and St. Lawrence Islanders (Scott and Gillispie 2004) and Debets (2006 [1975]) focused on the craniometrics of the Ekven remains. The physical anthropology of OBS relies on metric measurements, not DNA, although the inferences on pathology and age class provide some important data about geriatric conditions and life expectancy. The social implications of the mortuary data are discussed below.

Both OBS and Punuk cultures (Mason, this volume, chapter 20) are renowned for the number of formal interments in circumscribed cemetery precincts, with some areas that were apparently the province of distinct social groups within the communities, interpreted as clan or even moiety divisions. Grave offerings of artifacts were comparatively rare, within less than 1 percent of graves, in St. Lawrence Island (Bandi 1984; Hoffman-Wyss 1987; Staley and Mason 2004). Cape Dezhneva sites (Uelen and Ekven) revealed significantly higher proportion of offerings, with ca. 10 percent richly endowed—evidence of status stratification (Figure 17.4, cf. below). The development of cemeteries occurs with the earliest evidence of OBS occupation and must mark a fully sedentary society. Cemeteries are generally located distant from living sites; for example, on high ground above Ekven and on more landward ridges at Mayughaaq. Multiple

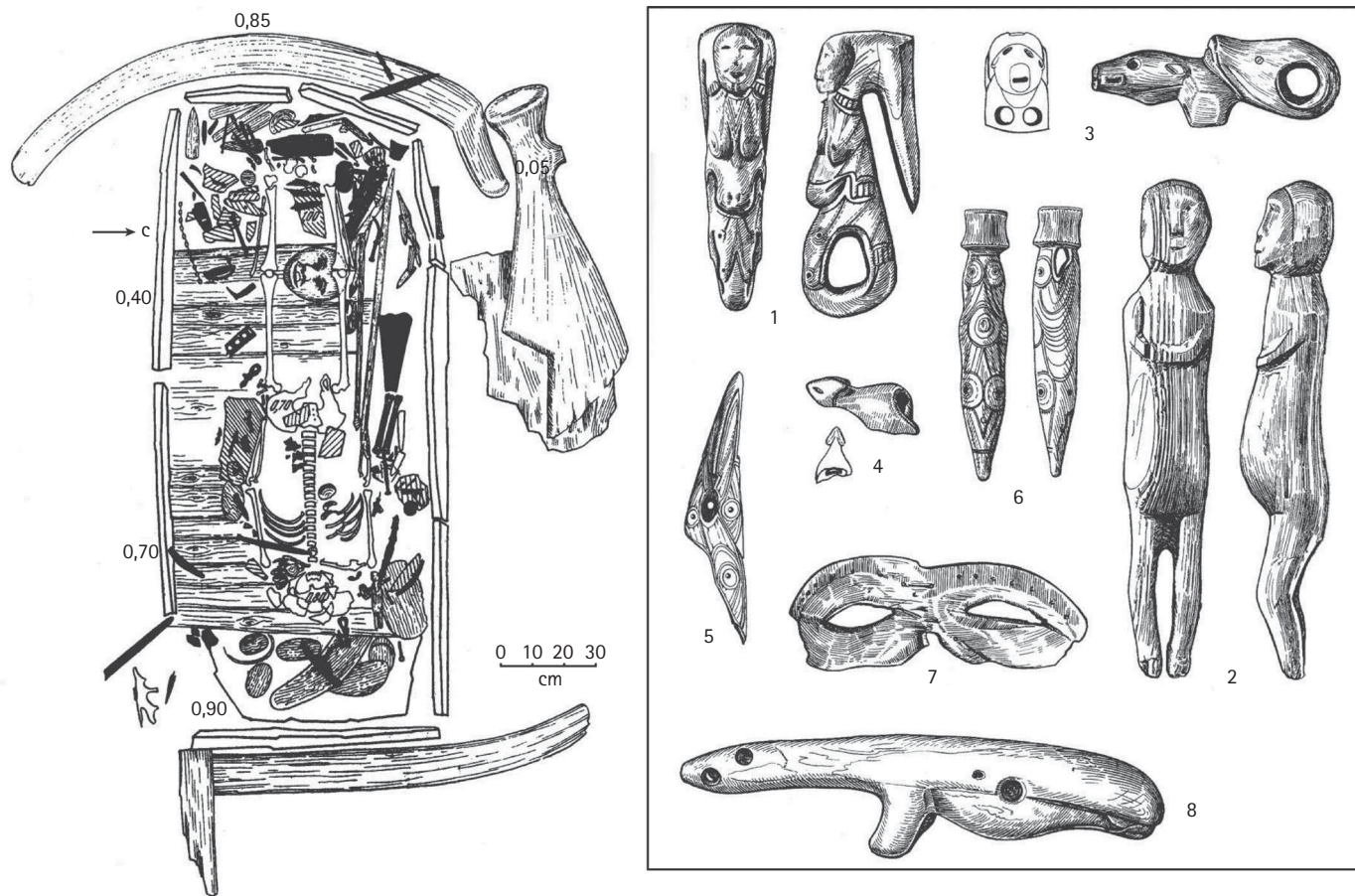


FIGURE 17.4 Roughly 10 percent of Old Bering Sea burials at Ekven are associated with high status. Left: Ekven Burial 154 was “the most elaborate burial” uncovered (Fitzhugh and Crowell 1988:126); the drum handles and the burial mask imply that this was a female shaman’s grave (Arutiunov and Sergeev 2006 [1975]:67–70, 133). Right: Illustration of several of the grave offerings: (1) towing hook; (2) wood figurine; (3) toggle; (4) arctic fox head; (5) harpoon head; (6) miniature harpoon foreshaft; (7) snow goggles; (8) bear carving. Other offerings included a pail handle, javelin, and ceramic stamp.

Image compiled by Owen Mason

burials suggest the persistence of memory and fidelity to collective burials, preserving clan or lineage identity. Radiocarbon ages from cemeteries, if sufficiently numerous, can provide long-term demographic reconstructions, following calibration and old-carbon corrections (Mason 1998). The calibration offered here indicates that population was highest later, between A.D. 1000 and 1400, which updates an earlier interpretation (Mason 1998).

Complexity and Social Status in Old Bering Sea Culture

Discerning the social derivatives or benefits of complexity is straightforward, while explaining its historical moment, its actors, and their actions in real time is less certain. To comprehend OBS whaling, Whitridge (1999:123–129) invokes both intrinsic and extrinsic processes, some with material signatures; for the intrinsic: (1) innovations in umiaq design, (2) in seafaring techniques, and (3) organizational improvements in crew size. Why and how did these develop? Two are analytically intractable: innovation in umiaq construction, especially prior to OBS, is virtually unknown from material remains, as is the size of watercraft and, hence, their limits on crew size. Organizational changes might be inferred from the social standings evident in mortuary remains, as discussed below. Two extrinsic factors drove OBS to increase or develop whaling: (1) the active colonization of islands with “severely impoverished terrestrial faunas” and (2) the concomitant development of “secure exchange relationships with caribou-producing groups” (Whitridge 1999:123–124). None of these processes are prime movers, all are symptoms of other processes in operation. Demography (increasing) and self- or family interest (differential success or power) must be in the forefront of the social and ecological theater for both increases in interethnic exchange, in colonization, and in innovation.

What *were* the ecological or social catalysts that produced OBS and its artistic florescence? First, there was an abundance of carving material, walrus tusk, and the cultural (i.e., psychic) necessity for its engraving. The development of an advanced decorative tradition continues to mystify archaeologists: the complexity of the style appears so suddenly. This is perhaps the intuitive (and unsubstantiated by ^{14}C ages) reason that the simplest style, Okvik, is arguably the earliest.

The first two or three centuries A.D. possibly witnessed a cooler climate that intensified upwelling, enhancing walrus and whale populations (Mason and Barber 2003). Apart from substantiating that a potential resource was abundant, ecological conditions alone do not explain the sudden development of complex societies—the development of social institutions and capital. On theoretical grounds, dedicated and designed cemeteries also co-occur with the onset of sedentism and are possibly causally linked. At Uelen, the arrangement of burials, some in multiple-use crypts, suggested to Arutiunov and Sergeev (2006 [1969]) the purposeful post-mortem reflection of social structure. In the Dezhneva cemeteries, a considerable array of decorated objects was entombed with only a fraction—less than 10 percent—of the

hundreds of burials, which is a disparity that demonstrates an extreme social stratification. This is possibly due to differential hunting success, which led to inequality and fostered hierarchy and, eventually, complexity within first-millennium A.D. communities at Cape Dezhneva (Arutiunov and Sergeev 2006 [1969], 2006 [1972]; Arutiunov and Bronshtein 1985; Leskov and Müller-Beck 1993; Mason 1998; Whitridge 1999). Familial and individual success led to the consolidation of power, and to mortuary displays with numerous symbolically significant offerings (e.g., masks, foreshafts, more than 10 harpoon heads). A few multiple interments were enclosed within or under a superstructure combining whale scapulae atop driftwood floor (Arutiunov and Sergeev 2006 [1969], 2006 [1975]). About a dozen Ekven burials were exceedingly well endowed: B-15, B-92, B-99/100, B-154, B-182–184 (Arutiunov and Sergeev 2006[1975]), and B-234, 250, 251, 300 (illustrated in Leskov and Müller-Beck 1993, tabulated in Mason 1998:257ff). Burial 154 was of a female shaman, and was one of the most elaborate (Fitzhugh and Crowell 1988) in the Ekven cemetery, containing an enigmatic wooden mask and an elaborate driftwood and whale-bone enclosure (Figure 17.4). Russian researchers argue that the spatial restriction of OBS winged objects within cemeteries resulted from “membership of the owners in specialized clans or federations” (Bronshtein 2002:131) that was maintained over generations through crypt reuse, evident as superimposed interments (Bronshtein and Plumet 1995). Other OBS cemeteries had similar percentage of high status graves, but the richest graves at Chini were not as well appointed. Chini Burial 38 was within a rock wall, capped by whale bone, and contained only two winged objects, several harpoon heads, and slate points (Dikov 2002 [1974]:36–38, Plates 24–26). Otherwise, in Chini cemetery, ca. 10 percent of burials contained winged objects, while many had ocher, skins, slate, or whale bone (Dikov 2002 [1974]). Status differentials were even more pronounced across Bering Strait in Alaska (Staley and Mason 2004), with only a single OBS grave out of more than 300 of diverse time periods at Mayughaaq being outfitted with high-status objects, which included a winged object over the chest, an iron point, an iron axe, and open-work carvings bearing OBS III motifs (Bandi and Blumer 2004b:161), although most impressive is a 60 cm long lance head, used either in whaling or in combat. At Kukulik, famously “the largest mound in the Bering Sea,” Geist and Rainey (1936:53, 80–81) did not encounter an associated cemetery; that reportedly lay on the rubble-strewn tundra 3 km inland. Five OBS-related people were entombed near a meat cache at the base of Kukulik mound, apparently starvation victims, not accorded “proper” burials (Geist and Rainey 1936:80).

Chukotkan mortuary remains, following Arutiunov and Sergeev (2006 [1975]:131) reflect (1) slavery, possibly of southern Alaska captives, evident in multiple, interdigitated flexed and bound burials, with one being an offering for the higher-status deceased; (2) the “subordination of women to men”; and (3) the occasional high status of women, judged from both the scale of gravel goods and ethnographic details that link the notched nodes on ulu handles to the whaling success of a husband. A remarkable circumstance at Ekven, evident in skeletal remains, was the likely high status of the arthritic and immobile elderly, who comprised nearly 10 percent of the population, as

emphasized by Krupnik (1993:220) based on the observations of Lebedinskaya (2006 [1969]:215)

The quotidian correlates of high status within the OBS culture remain uncertain, as no evidence exists for social space for theater—shamanistic or otherwise—and because so few OBS structures are excavated or described that it is nearly impossible to determine diachronic changes in house size and household composition, or to assess the role of craft specialization. The self-evident inference is that high status was associated with and supported the successful taking of both bowhead and gray whales (Dinesman et al. 1999). Nonetheless, the degree of aestheticism attached to virtually all of OBS objects, and the limited amount of grave accoutrement per individual internee, bolsters the case for craft specialization, as proposed by Mason (2006) for the neighboring Ipiutak culture at Point Hope. The development of complexity, rooted in inequality, was attributed to whaling during Punuk by Rudenko (1961:166), who offered a Marxist perspective on the consequences of the division of a whaling surplus between a successful crew and chief, and the reflection of that division in architecture. While OBS houses were inter-linked, with communal kitchens, Punuk houses were those of individual families, some richer than others. The implicit assumption is that whaling emerged full-blown only during Punuk.

The Fate of the Old Bering Sea Culture: Did It Persist until A.D. 1500?

As organizing social and cosmological force—if not as art style in practice—OBS objects do have an upper age linked to ^{14}C ages: direct assays on graves containing winged objects show their deposition continued between A.D. 1177 and 1463 within the “very complicated” Burial 49B at Ekven (Arutiunov and Sergeev 2006 [1975]:29–30), which contained an OBS harpoon head as well as two Thule types. Similar circumstances pertain to the thirteenth century A.D. context of OBS objects at Sivuqaq (Bandi and Blumer 2002:40). The most straightforward explanation of the continued burial of winged objects would be their curation, which implies—minimally—the continuation of the *zeitgeist* of the OBS, if not its artisans. A sizable fraction of the OBS burials, when corrected for marine carbon, do following A.D. 1000, implying its co-occurrence with Thule and Punuk.

In the conventional view, that of Collins (1937), the OBS culture had no real terminus, so much as it transformed into successor cultures, phases, or, most conservatively, the Punuk styles (Mason, this volume, chapter 20). Punuk has its earliest well-dated houses around A.D. 900 from Kitnepaluk (Blumer 1997), while the traditional termination date for OBS is earlier, ca. A.D. 700 (Ackerman 1984:108). The OBS relationship to Birnirk, direct or indirect, is problematic, the subject of another contribution (Mason, this volume, chapter 20). Art historians such as Arutiunov or Bronshtein might argue that as an all-encompassing cultural tradition, the maternal *ur-kultur* for Bering Strait peoples, OBS did not end so much as its symbolic system was simplified or it evolved, retaining much of its internal logic.

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CHAPTER 18

FROM THE NORTON CULTURE TO THE IPIUTAK CULT IN NORTHWEST ALASKA

OWEN K. MASON

THE NORTON TRANSFORMATION

THE adoption of ceramics in the Choris and Norton cultures was a pivotal moment in northwest Alaska prehistory. While a Siberian origin is generally conceded (Ackerman 1982), the ethnic origins are not established. In Chukotka, Yukaghir, and Chukchi peoples may be the descendants of the ceramic Ust-Belaia culture (Dikov 2004 [1979]: 110–121, Michael 1992:427), but none of the locales of Cape Dezhneva, Uelen, or Ekven preserves an underlying Norton occupation (Arutiunov and Sergeev 2006 [1969], 2006 [1975]). The cross-strait transfer of ceramic technology is attributed to contact or exchange, not migration (Ackerman 1982:33). Evidence of sedentism between 1000 and 500 B.C. is rare in northern Alaska: only two Choris or Norton occupations record any architecture (Darwent and Darwent, this volume, chapter 15). On Choris Peninsula, three oval large pole structures produced a sizable archaeofauna with ringed seal as the mainstay (Darwent and Darwent, this volume, chapter 15). The Choris inventory is extensive, including needles as well as “southern” traits such as labrets and a barbed seal dart that parallels the Aleutians and may reflect an influx of southerners (Dumond 2000a; Laughlin 1962). Evidence of mobility in Choris includes caches of finished bifaces at Cape Krusenstern (Giddings and Anderson 1986). At Kugzruk, near Bering Strait, two houses were constructed between 179 B.C. and A.D. 72, based on calibrated ¹⁴C assays (Giddings and Anderson 1986:30). The houses contained Norton lithics, ceramics, and birch bark, evidence of long-distance trade (Dumond 2000a:122). In addition, Kugzruk Norton people used labrets and “fished a great deal,” as inferred from net sinkers (Giddings 1967:190).

Norton occupation is not known from St. Lawrence Island and the island's Old Bering Sea lithic technology has an Archaic cast (Mason this volume, chapter 17; Mason and Gerlach 1995). Otherwise, the Norton occupation of northwest Alaska ranges from intensive within Norton Sound to thin across the Brooks Range to Barrow (Hall and Gal 1988). This substratum, in theory, produced the sedentism, status differentials, craft specialization, and cultism in the succeeding Ipiutak culture. Traces of Norton settlements around the forested northern shores of Norton Sound preserve hundreds of house depressions, whose archaeology remains imperfectly known, limited to reconnaissance by Giddings (1964) and Harritt (2011) at Difchahak and excavation by Bockstoe (1979) at Safety Sound. Within the warm water pool of inner Norton Sound, four sites (Safety Sound, Kwik River, Shaktoolik, and Unalakleet) each contain between 100 and 300 houses, evidence of sizable Norton villages at the mouths of salmon-bearing rivers. Beluga formerly fed on herring and other smolt in the shallows of Norton and Golovnin Bays (Huntington et al. 1999; Nelson 1899). Not accidentally, perhaps, the Norton Bay communities thrived in a wood-plentiful region—spruce forest extends to the coast (Giddings 1964)—unique from the Aleutians to Barrow. In addition, good access to the interior follows a portage to Kaltag on the Yukon River and as a shortcut to Kotzebue Sound through the Buckland drainage. The Norton-type site at Iyatayet (Giddings 1964) consists of a single house, not a village, and is small and unrepresentative, occupying a defensive draw along the steep bedrock of Denbigh Peninsula near Norton Bay.

The chronology of Norton settlement within Norton Sound is constrained by only 18 ^{14}C assays: Safety Sound ($n = 6$) (Bockstoe 1979:39, 43), Unalakleet ($n = 5$) (Lutz 1972:68–70), Difchahak ($n = 4$) (Harritt 2010:85), and Iyatayet ($n = 3$) (Giddings 1964:244); the last problematic. Most were run on charcoal more than 40 years ago (Giddings 1964:244–245), and some were presented with the 5730 half-life, a reporting convention that confounds use (Harritt 2010:86). Difchahak spit, near Shaktoolik, was first occupied within 500 to 300 B.C. (Harritt 2010:85), while Cape Nome's initial occupation, minimally, lies between 500 B.C. and A.D. 1, based on the ^{14}C age of 2216 ± 97 B.P. (I-6085) (Bockstoe 1979:39). Unalakleet residence may be contemporaneous, or later, at 358–49 B.C., 2140 $\pm$ 47 B.P. (P-1771), from a collapsed roof timber (Lutz 1972:70). Late Norton occupations fall within two periods: the first three centuries A.D. and between A.D. 400 and 600 (Lutz 1972:69).

Of the hundreds of depressions at the now-inland Unalakleet beach ridge complex, Lutz (1972, 1973) tested five houses and one large structure, a qargi, 8×12 m, resembling the Ipiutak qargi at Deering (Larsen 2001). Its Norton attribution relies on end and side blades and several potsherds (Lutz 1972:344), with centuries-long use inferred from 50 cm of midden, (Lutz 1972:67), dated A.D. 122–263 (P-1772) and A.D. 400–600 (P-1530), which is contemporaneous with Ipiutak occupations at Qitcheauvik (Mason et al. 2007) and Kotzebue Sound.

Norton house size at Cape Nome spit may reflect demographic and social processes (Mason et al. 2007:146–149), employing the 1969 site map of Bockstoe in the UAF archives. Individual Norton house size decreased by more than 50 percent, but

the number of houses quadrupled so that population likely increased. Did a shift in the domestic cycle occur? From extended families in large houses in early Norton (300–1 B.C.) to single families residences in late Norton (A.D. 200–400). Bockstoce (1979:58, 88) inferred a population decrease in late Norton due to the absence of net sinkers that implied the abandonment of fishing, and exclusive winter residence. As at Point Hope at Ipiutak, a high number of end blades was considered a proxy for intensified caribou hunting, not warfare (cf. Mason 2006). In summary, the sparse record from Norton Sound suggests that a sizable and sedentary late Norton population resided along the mouths of several salmon streams during the early centuries A.D., employing larger structures as men's or community houses, manufacturing ceramics and using labrets and oil lamps—in contradistinction to their northern neighbors, the Ipiutak.

THE NORTON ENTRY INTO KOTZEBUE SOUND AND NORTHERN ALASKA

Contrasting with the dense villages within Norton Sound, the north Alaska coast to Barrow seems barely occupied, only a house or two (Giddings and Anderson 1986; Hall and Gal 1988; Schaaf 1988b). Salmon are less abundant north of Bering Strait, and in the absence of whaling, the potential for surplus and storage seems minimal. Climate, intensified ice or cold, during the Neoglacial is offered as explanation by Lutz (1982) who proposed that salmon were unavailable in the Chukchi Sea, while Crockford (2008) offered that persistent year-round sea ice restricted whale migration to south of Bering Strait. However, open water in fall can be inferred from the heightened erosion recorded at north Alaskan beach ridges during the second to first millennium B.C. (Mason and Jordan 1993).

Only scant Norton traces occur on Kotzebue Sound beach ridges, both at Capes Krusenstern and Espenberg, with more than 100 scatters of lithics and ceramics (Giddings and Anderson 1986:209–230, 268–272; Schaaf 1988), and, occasionally, exotic chert from the Brooks Range (Malyk-Selinova et al. 1998). Primarily brief visits for eggs and/or feathers occurred at the Cape Espenberg marshes, in view of the bird bone residua dated in the last several centuries B.C. (Schaaf 1988, Harritt 1994). At Cape Krusenstern, 19 undated localities on three ridges contain a few lithic artifacts, charred pebbles and an occasional whale vertebra (Giddings and Anderson 1986:169–174). That both Cape Espenberg or Krusenstern lack houses or graves provides negative evidence for a population surge or increased social complexity, likely a consequence of high mobility or winter residence on the pack ice (Lucier and VanStone 1991).

Despite the low-density occupation across northern Alaska, sedentism seems evident from the first use of cemeteries: nearly 20 Choris and/or Norton graves are documented from both Chukotka and northern Alaska: at Ust-Belaia, Battle Rock, and at Point

Hope, termed Jabbertown (JB). The occasionally plentiful or exotic grave offerings may reflect higher-status Big Men, traders or travelers who obtained exotic materials, such as obsidian or bronze. At a caribou crossing at Ust-Belaia on the middle Anadyr River in Chukotka, a cemetery contained 15 mounds (Dikov 1963:534, 2003 [1977]: 123–126, Plates 95–100) with complex stratigraphy, multiple interments at differing levels and directions. In Mound 8, four burials contained exotics: obsidian, bronze burins, awls or needles, a walrus harpoon head, shell beads, while an underlying pit held ocher-stained scrapers and a dog burial. Mounds 8 and 9 are presumably contemporaneous with Mound 15, dated between 1300 and 825 B.C. The Ust-Belaia assemblage resembles Choris in a bifacial, microblade technology, and its ceramics, with an ultimate origin within the Chukotka Neolithic (Dikov 1963:536). Bronze at Ust-Belaia (Dikov 1963:536) establishes the time depth of East Asian contact near Bering Strait.

Grave goods with five undated Battle Rock burials, 21 km north of Cape Krusenstern, are considered evidence of Norton-to-Ipiutak continuity, based on stylistic simplicity (Giddings and Anderson 1986; Workman 1982). The Battle Rock arrow and spear heads reveal Choris and Norton affinities, and “spurred . . . lines [that] resembl[e] . . . Okvik” (Anderson 1986:315; Giddings and Anderson 1986:147–149). The Battle Rock burials were of two young males (Simmons, in Giddings and Anderson 1986:359), interred with barbed arrow points (Giddings and Anderson 1986:Plate 85 ff, gg) for warfare or Ipiutak-like open work carvings, chains and swivels (Giddings and Anderson 1986:Plate 86a, h, k–r, pp. 148–149). With over 340 objects, the Burial 4 accompaniment is the richest in all of northwest Alaska prehistory. Battle Rock Burial 4 is considered “early” or “aberrant” (Giddings and Anderson 1986:177–186; Workman 1982:115), due to its linear Choris or early Norton ceramics. A “death mask” covering over the eyes of the deceased both prefigures and shows evidence of continuity with Ipiutak (Giddings and Anderson 1986:Plate 107d, e), supplemented by Okvik or Old Bering motifs (Giddings and Anderson 1986:185). Two-thirds of the Burial 4 offerings were end blades, some broken, (Giddings and Anderson 1986:178–179), representing a weapons cache or the offerings to a hero. Other pursuits revealed include leisters for fish spearing, hide scraping, sewing, antler strips for grooving wood or peeling bark and stone working tools. Does the well-accomplished man at Battle Rock reflect a Big Man economy, possibly based on whaling?

INCIPIENT COMPLEXITY AT TIKIGAQ (POINT HOPE)

The earliest evidence for a Norton (“Near Ipiutak,” *sensu* Larsen 1982) encampment in northwest Alaska is at Point Hope: a single house and two camps dated 100 B.C. to A.D. 100 (Larsen 1968). Another 30 relatively deep middens and more than 20 graves are scattered across 500 m (Larsen and Rainey 1948:251–253), some dated to the last centuries B.C. (Newton 2002). The occurrence of walrus within the earliest occupations at Point

Hope is part of a region-wide pattern (Hill 2011) and may point to a causal relationship, as Collins (1940:565) proposed. The “many animal bones” in House 24 establish that caribou, seal, and walrus were the dietary mainstays (Larsen and Rainey 1948:165), supplemented by fishing, as inferred from spear prongs, and, possibly, whaling. The whaling is contentious: either a “casual interest” (Harritt 1995:36), based on two whaling harpoon heads in Burials 83 and 85, arguably, proof (“beyond a doubt”) of accomplished whaling (Larsen and Rainey 1948:163, 241–242, one decorated, Plate 79:1, 2). Grave goods from the Near Ipiutak Jabbertown burials may indicate the *in situ* development of Norton into the Ipiutak culture, bearing in mind that only subtle end blade characteristics or the presence of pottery or whaling harpoon heads truly distinguish Near Ipiutak from Ipiutak (Larsen and Rainey 1948:162). Burial taphonomy suggests post-mortem disturbance: objects range vertically within 1 m, and the sparsity of bone indicates scavenging or secondary interment. Norton shamans or artisans either prefigured or developed the Ipiutak vocabulary, evidenced by antler open work pieces bearing Ipiutak motifs in two early graves, B 98 and JB 7 (Larsen and Rainey 1948:245, 251; Plates 59, 66–68), dated between 250 B.C. and A.D. 90 (Newton 2002:99). Two other graves (B102 and 134) of “uncertain type” (Larsen and Rainey 1948:102, 250) may reflect a transitional Norton-to-Ipiutak presence on the Tikigaq spit during the first centuries A.D. (Newton 2002:99). Still, the Norton occupation at Tikigaq remains enigmatic: whaling and shamanism, linked with mortuary practices, bolster an admittedly weak case for sedentism at Tikigaq prior to Ipiutak. In essence, Near-Ipiutak Norton pot-makers and whalers, likely producing a surplus, were abruptly succeeded by Ipiutak, nonwhalers, incapable of ceramic manufacture, a sudden transformation that implies the influence of outsiders as catalysts. A Norton presence, contemporaneous with, or following, Ipiutak, occurs across the North Slope. The most problematic is the large, probable qargi structure at Feniak Lake in the Brooks Range, dated to the early first millennium, older than most Ipiutak sites (Gerlach and Mason 1992; Mason 2000). Small Norton scatters occur around Barrow (Hall and Gal 1988), and at Siraagruk near Wainwright, end blades were excavated and dated to A.D. 135–540 (Gal 1982:172), when calibrated. Across the Arctic Coastal plain, Norton lithics and ceramics were discarded: along the Meade River from A.D. 600 to 800 (Gal 1982:34), and east to the Gallagher Flint Station on Sagavanirtoq River, possibly dated to the late first millennium A.D. (Gal 1982:168, 170). At the forest margin on the Kobuk River at Onion Portage, a late Norton (A.D. 400–700) occupation discarded over 1,200 lithics (25 percent end or side blades) and only two potsherds, distributed between more than 50 hearths and two structures; one a winter house (Anderson 1988:46, 113).

To summarize, small and isolated Norton occupations appear in Chukotka and across northern Alaska during the last centuries B.C. and into the early first millennium. In several cases, discrete but small cemeteries occur for the first time in prehistory and may reflect a trend toward sedentism subject to an unknown catalyst either by whaling or from harnessing salmon runs within Norton Sound. A transgressive age distribution suggests that Norton people entered Kotzebue Sound from the southeast, possibly having encountered Athapaskans in the Buckland vicinity, apparently the source of

any forest-adapted technologies such as birch bark manufacture or sled production (Larsen 2001).

DEFINING IPIUTAK: WOOD HEAT AND BIRCH BARK CONTAINERS

During the first centuries A.D., nearly contemporaneous with the Old Bering Sea (OBS) culture (Mason, this volume, chapter 17), especially in its latest incarnations, Ipiutak arose on the Alaskan mainland, possibly as the ally or rival of OBS for temporal and sacral power. Ipiutak is one of few Arctic cultures defined by negatives and lost technologies (Larsen 1954:75, Larsen and Rainey 1948)—if it derived from the Norton culture, as its lithic technology implies (cf. Larsen 1982, Anderson 1984). Several practices seem emblematic, such as the substitution of birch bark for ceramics, as is the absence of stone or ceramic lamps, associated with oil heat and lighting. Sea mammal hunting accessories (e.g., the drag float, wound plugs) are absent from Point Hope, a consequence possibly, as Larsen and Rainey (1948:77) admitted, of poor wood preservation. Although absent from Point Hope, an atlatl was recovered at Deering (Larsen 2001:35). Ipiutak watercraft use also remains uncertain (Larsen 1952:24): Notable is the lack of kayak or umiaq parts, although a birch bark “canoe” model at Deering implies an alternative technology (Larsen 2001:46, Figure 29).

From such absences, Ipiutak originated primarily in the forest, argued Larsen (1952:28), following his fellow Danes, Steensby (1885) and Rink (1916), postulating an annual winter retreat into the forest due to a reliance on wood for heat along a supposedly driftwood-limited coast (cf. Mason 1998). The boreal forest might yield the requisite data that will confirm Ipiutak origins—at least one purported, not so convincing Ipiutak occupation, at Hahanudan Lake does lie wholly within the trees (Clark 1977). Likewise, the intensity of a definitive Ipiutak occupation on the Kobuk River is thin and, possibly, younger than the coastal occupations—or related to Norton (Anderson 1988).

An interior inheritance, or infusion, underpins the Ipiutak culture, in Larsen’s (2001:29–30, 41–46, 52, 59, 61, 66, 70) reading of the Deering qargi, which contains crucial objects that share an Athapaskan ancestry, primarily, the built-up sled, snow shoes, birch bark containers, and bear tooth knives. Beaver incisors and, especially, birch bark may require direct familiarity with the forest, since birch is rare in driftwood (Alix, pers. comm.). Birch bark basketry for cooking or storage may reflect ethnic origins or contacts beyond the coastal *oikoumene* of the ceramic Norton culture. The penetration of the forest at Norton Bay was possibly linked with the presence of Athapaskans, whose marriageable women presumably offered birch bark sewing skills and the preference for bark. Although the absence of ceramics has troubled researchers for some time: birch bark vessels may be preferable and more durable in a high-mobility strategy that apparently characterized the Ipiutak.

THE IPIUTAK CULT: SPATIAL DISTRIBUTION

The Ipiutak “cult” (Mason 1998, 2006, 2014) had several centers, representing shamans and communities that interacted within a common *Zeitgeist*. The large settlement at Point Hope lies toward, if not at, the northern extreme of Ipiutak settlement (Larsen and Rainey 1948)—a distinction now held by a collapsed fifth-century A.D. structure at Point Barrow (Jensen 2009). Ipiutak occupation skirts Kotzebue Sound (Giddings and Anderson 1986), at Kivalina (Stern et al. 2010), Kotzebue (Shinabarger 2014), the lower Noatak (Hoff et al. 1991), and Deering (Larsen 2001, Bowers 2009). Its southern limits are at Point Spencer (Larsen 1979/80) and across central Seward Peninsula (Larsen 1968) and Cape Espenberg (Harritt 1994), and, farthest south, within Norton Sound at Qitchauvik (Mason et al. 2007). The Ipiutak presence extends across the Brooks Range to Itkillik Lake (Reanier 1992), with sites preferentially on lakes (Hall and Gerlach 1988; Irving 1962) or mountain passes (Campbell 1962; Mills et al. 2005). The villages at Cape Krusenstern and Point Hope offered considerable intellectual and political significance for the Ipiutak world: based on common iconography, distant communities participated within an integrated cultural system linked by trade and ritual.

THE IPIUTAK ECONOMY

Subsistence

The technological and economic basis for Ipiutak resembled many Arctic maritime hunters in northwest Alaska: a reliance on ringed and bearded seal—as even Larsen (1952:24) admitted—supplemented by caribou. Whaling was possibly idiosyncratic—e.g., a whaling harpoon head at Krusenstern (Giddings and Anderson 1986:153)—nonetheless, Ipiutak people did not whale, averred Larsen and Rainey (1948:163), despite whale bone burial markers and the occasional shovel (Larsen and Rainey 1948:248–249). Walrus were locally important, e.g., at Point Hope (Larsen and Rainey 1948), and their abundance led to craft specialization (cf. Mason 2006, 2009) and fostered trade, as possibly did the surfeit of caribou skins (Mason 1998). Both walrus and caribou served crucial functions, dietary and in manufacture (i.e., boat covers, hunting implements, clothing, architectural coverings)—although Larsen (2001:35) argued improbably for a birch bark replacement on kayaks.

Quantified archaeofaunal studies are recent analytic approaches; previous researchers inferred dietary choices from percentage counts of animal bones (Larsen and Rainey 1948:68) that demonstrated that Ipiutak at Point Hope relied on seal (53 percent), walrus (23 percent), bearded seal (12 percent), and caribou (10 percent). Quantitative analyses show that small mammals and, especially, birds played a larger role in Ipiutak subsistence than formerly thought—at least, locally, at Deering (Moss and Bowers 2005;

Saleeby 2009). The volume of ringed (> 500) and bearded (> 150) seal bones could be cumulatively immense, as in the mound near House 30 at Cape Krusenstern (Giddings and Anderson 1986:130). Fishing was likely significant, considering the spears at Point Hope (Larsen and Rainey 1948:78–79). Despite the evidence of maritime hunting, early researchers emphasized caribou hunting—even on the coast (Larsen and Rainey 1948:146–147)—although this inference employs the functional categorization of arrow points for hunting, not warring (cf. Mason 1998, 2006).

Inland areas were the principal arena for caribou exploitation; Onion Portage was revisited at least 60 times (Anderson 1988:121) and Anaktuvuk Pass witnessed similar attention (Mills et al. 2005) with the discard of Ipiutak arrow points, fishing spear or leisters and end blades—albeit in an ambiguous context (Campbell 1962:47, Plate 5). The charred caribou bone and artifact scatters at Onion Portage had such a complexity as to impress Anderson (1988:122) as the residua of fall *plein-air* camps. Sophisticated archaeofaunal data and analyses of caribou hunting are restricted to Tukuto Lake, whither drives into lakes may have occurred in fall (Speiss 1979), and at Anaktuvuk Pass, where a highly fragmented fauna records the “procurement of mature animals . . . [during] a summer or fall encampment, based on the location of tent structure (Mills et al. 2005:44–45). Fishing was also in evidence, based on spears and leisters (Campbell 1962:47).

Trade and Exchange

Ipiutak people maintained numerous long-distance contacts—either direct or indirect—ranging from Kamchatka and Chukotka across the Brooks Range and amongst themselves, most in evidence between Point Hope and Deering (Mason 2009a, 2014). Two metal or stone objects from the Deering Ipiutak house were obtained from Kamchatka, several hundred km distant: metallurgical iron and obsidian (Reuther, in Bowers 2009:201). That iron was used in engraving is evident from three occurrences over a wide zone: (1) an iron burin in Point Hope House 51 (Larsen and Rainey 1948:83, Plate 8:24); (2) an engraver bit within Ipiutak House 1 at Deering (Bowers 2009); and (3) at Hahanudan Lake (Clark 1977:69). Brooks Range chert was in considerable demand across the Ipiutak world, as was jet, employed for decorative insets in mask-like carvings and figurines (Mason 2009b). Commodities that changed hands included walrus tusk traded to neighbors in Bering Strait, especially Old Bering Sea, probably caribou skins as well, from the interior (Mason 1998). However, in comparison to other, later “Thule” peoples, Ipiutak traded in far fewer commodities (i.e., lacking is evidence of an Ipiutak trade in jade, slate or, of course, clay).

The nearly identical motifs that occur on Point Hope, Deering, Paipelghak, and Ekven objects, especially on spear heads (Figure 18.1), are evidence either of the exchange of ideas among ethnic groups or the curation of war trophies. Common intellectual legacies are apparent in the stylistic similitude of the Old Bering Sea and Ipiutak design motifs, the common use of atlatl stabilizers, and the Deering and Point Hope maskoids. The fabled Deering Burial 4 maskoid bore a dual dot and line motif with multiple rays that is nearly identical

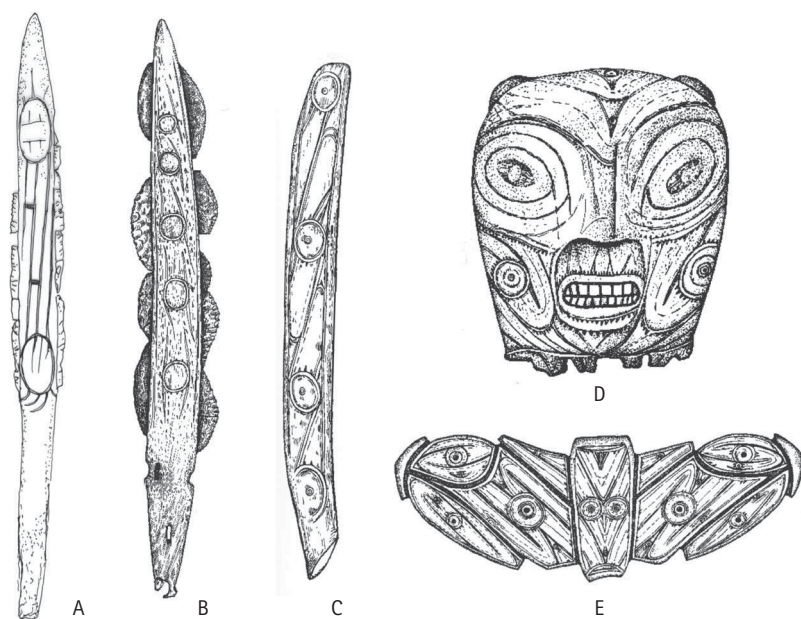


FIGURE 18.1 Regional interactions between Ipiutak and Old Bering Sea cultures. Nearly identical objects from widely separated areas: (a) Deering, Alaska; (b) Paipelghak, Chukotka; (c–e) Ekven: objects from Ekven Burial 304, including dagger maskette and winged object, a counterweight to an atlatl spear. The Deering dagger (a) bears dual oval motifs, resembling the pieces (b) from Paipelghak (obtained from House 1), and (c) Ekven. The Deering dagger was recovered from Burial 1, a body impaled with multiple weapon tips. The interaction represented by three objects is uncertain. Source of images: (a) Deering, Mason in Bowers (2009); Ekven and Paipelghak, Bronshtein et al. (2007): (b) 104, (c) 146, (d) 166, (e) 101.

Image compiled by Owen Mason

to a flint flaker (Figure 18.2) from Point Hope House 32 (Larsen and Rainey 1948:94) that is fortunately, contemporaneously ^{14}C dated to between A.D. 600 and 800 (Mason 2006, 2009c). More problematic are the emblematic designs on a double biface-inset spear in Deering Burial 1 that is identical to a spear from Ekven (Fig. 18.1)—is this common culture or an enemy spear buried with its victim? (Mason 2009b: Fig. 10–19a, b and c).

Social Capital Expressed in Ipiutak Art

Both in prehistory in modern historiography, the Ipiutak cult has maintained its grip through the profundity of its iron-engraved walrus tusk mortuary objects, tied very likely to shamanic performances within the qargi (Mason 2006, 2009b, 2014). The cosmic dimensions of Ipiutak iconography are tracked through a bear cult (Larsen 1979–1980; Collins 1961:18), a vision quest exemplified by the loon (Morrow and Volkman 1976) in shamanic flight allegorized by the transformative, bot-fly larvae (Mason

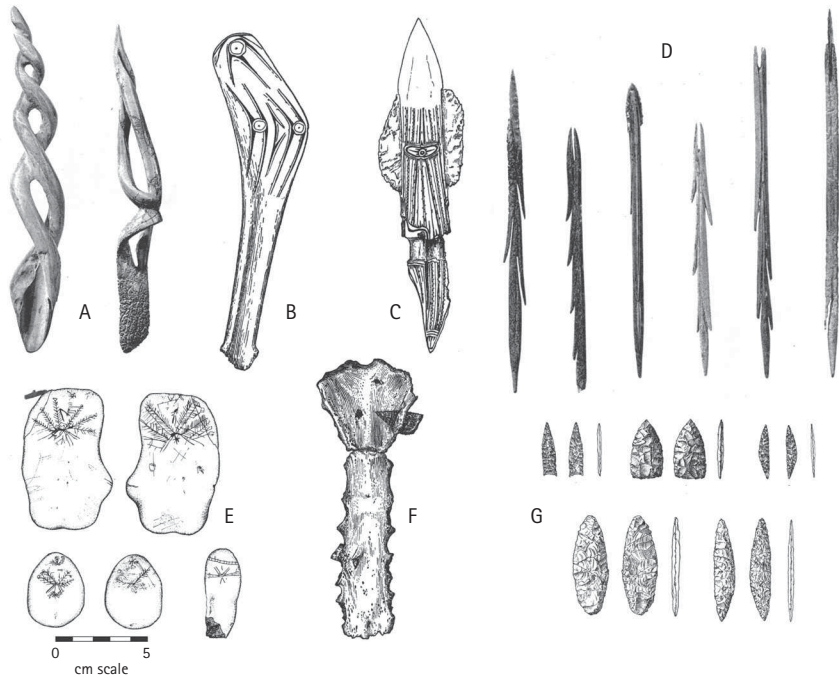


FIGURE 18.2 Ipiutak lithic and organic technology, including armaments employed in warfare. From upper left: (a) open-work carvings, of unknown use; (b) decorated antler flaker with dual ray motif similar to Deering mask: Ipiutak House 32 (cf. Mason 2009b); a date from the house falls at $1320 \pm \text{B.P.}$ (K-2743), A.D. 640–870 (Mason 2006: 105); (c) Okvik decorated harpoon head: House 69, with an associated age of $1390 \pm 70 \text{ B.P.}$ (K-2746), A.D. 540–770 (cf. Mason 2006: 105); (d) arrowheads, Type 3: Burials 8, 96, 106; (e) inscribed pebbles, “represent[ing] schematic faces with tattoo marks around the mouth”: House 40, Cape Krusenstern; (f) human sternum, impaled with stone endblade: Ipiutak Burial 89B; (g) Side- and end-blades used as arrow-point insets; from upper right: harpoon blade, knife side blades, lower: House 50, with an associated age of $1490 \pm 70 \text{ B.P.}$ (K-2745), A.D. 430–680 (cf. Mason 2006: 105).

Sources: Larsen and Rainey (1948): (a) Plates 61:7, 8, (b) 94, (c) 73, Figure 14, (d) Plate 33:11–16, (f) 61, (g) 96, Figure 20; Giddings and Anderson (1986): (e) 140–141, Figure 91. Image compiled by Owen Mason

2009b, 2014). The Ipiutak “mystical regard” for animal souls may be evident in the hundreds of piled-up seal skulls (“a mound”) at Cape Krusenstern (Giddings and Anderson 1986:130). Several Ipiutak objects have gained wide currency, even in global art history texts; termed “death masks,” these composite wreaths (Mason 2009a) were found only at Point Hope in burials 64 and 77 (Larsen and Rainey 1948:238, 240–241) and within Burial 4 at Deering (Mason 2009a). The masks are composites, assemblies of roughly a dozen ivory pieces arrayed in a human face, with intaglio representations of animal faces, bot-fly larvae arising out of nostrils and a prominent down-turned mouth.

Shamanic uses are inferred for various Ipiutak objects. Decorated sucking tubes were used as healing devices at Point Hope (Larsen and Rainey 1948:Plate 26) while open-work carvings ($n=100$) (Figure 18. 2) likely served as attachments in shamanic

accoutrement (cf. Nelson 1899) and occur at Point Hope (Larsen and Rainey 1948:119, 129-135), Kivalina (Stern et al. 2010) and Qitcheauvik (Mason et al. 2007). An elaborate polar bear comb or “rake” from Point Spencer is among the most profound examples of Ipiutak iconography (Collins 1961:18), hampered only by its undated, poorly known context (Larsen 1979–1980), problematically “more suggestive of modern Eskimo art than Ipiutak” (Collins 1961:18). The polar bear sculpture has a fanged, gaping mouth, part of a pan-Arctic bear cult (Larsen 1979–1980), and the piece has shaman-transformative aspects in its multiple orientations, including accessory animals outward and inward facing, along with tattoos (Collins 1961:18). Another similar, but roughly executed, rake occurs within Point Hope Burial 89 (Larsen and Rainey 1948:145). A copiously decorated baby walrus (Larsen and Rainey 1948:125–126) was possibly sewn to a shaman’s garb (Anderson 1984:89). Browbands, attached to wooden hats, illustrate iconic, open-mouthed creatures, resembling the “combs” or maskoids. The fastenings of the Deering maskoid suggest a placement on clothing (Mason 2009a), the case for the dangles. Engravings on the maskoids, sucking tubes and browbands parallel inferred tattoo and body art that also occurred with labretifery, as in Ipiutak Burials 21, 108 (Larsen and Rainey 1948:115, 116-119, Plate 52:3). The inferred Ipiutak tattooing resembles that of OBS or possibly Siberian tattoo (Fitzhugh 2014:284), but unlike in OBS, labrets were standard accessories, present on several human figures and portraits, but rare ($n = 7$) in graves.

Ipiutak Architecture: Houses, Camps, and Cache Pits

In its number of preserved and excavated structures, Ipiutak contrasts starkly with nearly every other culture in northwest Alaska; well known is the presence of 575 house ruins at the type site across four Point Hope beach ridges (Larsen and Rainey 1948:16). The culture built a variety of structures: caches, summer and winter houses, and community “halls” (qargi). Cache pits were locally important, although not reported at Point Hope by Larsen and Rainey (1948), but were relatively common at Cape Krusenstern, likely co-occurring with ephemeral summer camps (Giddings and Anderson 1986:146).

Beyond Point Hope, the largest occupation was at Cape Krusenstern with 70 houses across five ridges within eight discrete settlements (Giddings and Anderson 1986:118). Two small temporary, driftwood structures were damaged by fifth-century storms at Point Barrow (Jensen 2009). On Seward Peninsula, Cape Espenberg had several small arrays, each with two to four houses (Giddings and Anderson 1986; Harritt 1994), while evidence from Deering records only four houses and a qargi (Bowers 2009; Larsen 2001). Inland, two at Onion Portage (Anderson 1988) and one at the Bateman site (Reanier 1992) while Hahanudan Lake (Clark 1977:69) revealed at least two of purported Ipiutak affinity. Ipiutak is also unique in its large sample of archaeologically examined houses; over 70 at Point Hope (Larsen and Rainey 1948), with three houses excavated in the 1960s, but not analyzed, by Hosley (1967:13), and one by Jensen (2009) in the late 1990s. Cape Krusenstern offers another 20 excavated houses (Giddings and Anderson 1986:118). The remaining sites contribute eight more, including two “Norton-Ipiutak” houses within Band 2 at Onion Portage

(Anderson 1988:121–122), one at the Bateman site (Reanier 1992), and three putative (cf. Hall and Gal 1995) Ipiutak houses at Cape Espenberg (Harritt 1994:111–126), as well as a collapsed structure at Point Barrow, Nuvuk (Jensen 2009). Hearths unassociated with houses occur at Onion Portage (Anderson 1988:121) and in Anaktuvuk Pass (Mills et al. 1999).

Ipiutak house size at Point Hope is bimodal around a mean of 16 m²: a sizable number (25 percent) are large, between 25 and 30 m², while as many are smaller than 16 m² (Mason 1998:27). One house, with a lengthy north-facing entry, at Cape Espenberg circumscribed 25m² (Harritt 1994:114). Such size variability reflects household composition and/or comparative status. Three distinct types of Ipiutak house also occurred at Cape Krusenstern (Giddings and Anderson 1986:119). The most substantial was cut 1 m into the ground, sided with horizontal logs and covered with sod. Many, if not most, have short entries reflecting winter use. Structures of more sizable dimension, above 40m², are considered community structures, qargi. The largest Ipiutak structure at Cape Krusenstern, House 17, enclosed 42 m², and had a central hearth. Larger than most houses, House 17 contained a fragmentary “whaling harpoon head, with Ipiutak motifs but that resembles Okvik” (Giddings and Anderson 1986:123).

The household inventories within Ipiutak houses were so variable that that at Point Hope craft specialization in ivory working and clothing manufacture was inferred by Mason (2006, 2009b), based on the uneven concentrations of needles, ivory debitage, and stone points. At Cape Krusenstern the excavation of 20 square wood-heated driftwood houses mostly produced lithics (scrapers, discoids, etc., ca. 50–100; Figure 18.2), and a few decorated pieces, 85 incised pebbles with enigmatic designs, most in the House 40 qargi (Giddings and Anderson 1986:140–141), line-engraved snow goggles, a linear engraved, dual side-blade sealing harpoon head from House 11 (Giddings and Anderson 1986:144), as well as a fragmentary whaling harpoon (Giddings and Anderson 1986:123). An Ipiutak house at Deering covered 9–12 m², outlined by narrow timbers and a short arctic entry (Mills, in Bowers 2009). The structure’s small inventory had Ipiutak motifs, including a seal-head iron-inset engraver and a spurred sealing dart, discoidal scrapers, and end blades (Reuther, in Bowers 2009:201–217).

THE QARGI: SOCIAL INTEGRATION EVIDENT IN ARCHITECTURE

Qargi occur at regularly spaced intervals across northwest Alaska: (1) Point Hope, (2) Feniak Lake, (3) Desperation Lake, (4) Deering, (5) Cape Krusenstern, (6) Qitchuavik, and (7) Unalakleet. Nearly all were contemporaneously occupied, although Feniak and Unalakleet could be evidence of a preceding Norton organizational regime. Mason (1998:302, 2006:114) speculated that the regional spacing of Ipiutak qargi reflects several interacting politic-religious nodes, used for gift-exchange, and shamanic theater. Many commodities likely traveled between qargi centers: iron, obsidian, ivory, caribou skins, and seal oil.

Assemblages within qargi vary between the coastal and interior. A large oval wood walled qargi ($>120\text{ m}^2$) along inner Golovnin Bay at Qitchauvik (Mason et al. 2007) was a nexus for male activities such as tool production and woodworking (Alix 2007). Its use as a theatrical space is recorded by several wood carvings: of human maskettes, a seated human in shamanic transformation, and of caribou, one with an X-ray skeletal motif (Mason et al. 2007:88). The qargi was buried by a 50 cm storm bed (Mason et al. 2007:62–63), which could account for its singularity; no graves or houses were adjacent. The structure contained a small OBS or Ipiutak assemblage with a browband with curvilinear motifs, linear engraved arrow points, an open-socket Oopik sealing dart, and an open-work carving; two stone lamps are possibly intrusive or of influences from adjacent Norton villagers at Unalakleet. The two undated Point Hope qargi differed in size but offered comparatively little in terms of artifacts; a few objects could be considered gender related, but the large space may have been more used for performance or gatherings. Although each Krusenstern community had a single large structure, each had only sparse occupational debris, although tool manufacture activities were common at Deering (Larsen 2001:49–60) and Cape Krusenstern (Giddings and Anderson 1986:133, 136).

The sizable Deering and Feniak qargi also had limited numbers of artifacts, although the inscribed stones in the latter seem indicative of shamanic theater. The Deering wood and birch bark roofed structure, $>108\text{ m}^2$, is well preserved; the timbers in the Deering qargi were so substantial, ca. 40 cm, that Larsen (2001:18) inferred that the wood was procured from the forest by sled. Mason (1998) calculated that, minimally, 45 people could occupy the Deering qargi, even more as an audience, arrayed in three benches around a central fire (Larsen 2001:23). The artifact inventory had few decorated pieces (a harpoon socket and a flaker [Larsen 2001:32, 67]) although stone, organic, and wood objects were abundant—including bow parts, spoons, trays, and a sled (Larsen 2001:40). The Deering qargi was one of the largest built prehistoric spaces known in northwest Alaska; similar in size was the purported (i.e., poorly excavated) structure at Feniak Lake (Hall 1974). The inscribed stones at Feniak may be distinctive markers of shamanic performance and are paralleled at Cape Krusenstern (Giddings and Anderson 1986) and the Desperation Lake qargi (Irving 1961). The Desperation Lake qargi with its imposing 2 m stone walls, had evidence of gendered activities: side blades, a discoid, and enigmatic pictographs, possibly for shamanizing.

CHRONOLOGY, POPULATION, AND SETTLEMENT PATTERNS

The aggregation of houses ($n > 575$) and burials (> 120) along Point Hope linear beach ridges (“avenues”) has dominated discourse on Ipiutak (Mason 2006). The public-relations offensive by Rainey (1942; *Time magazine* 1942, 1948) defined Ipiutak as a town of over 4,000, the largest in North America for its time. This characterization ignored facts

on the ground (e.g., tightly packed structures, cf. Larsen and Rainey 1948:Map 1) but has proved resistant to reanalysis (Mason 2006). Larsen (1952:24) favored a seasonal trading aggregation, akin to nineteenth-century practices (Nelson 1899). At the other extreme, McGhee (1976) proposed, improbably, that one or two families produced the hundreds of houses by moving their house annually over many generations. During any one generation between A.D. 600 and 900, the Ipiutak settlement at Point Hope contained between 150 to 250 people, during both winter and summer (Mason 1998, 2006). This population estimate was calculated from total occupation space in the 600 houses, assuming one person per 2.16 m², dividing by a 300–350-year time span (Mason 1998). The overlap of houses at Point Hope is too dense to delineate discrete villages, save with a comprehensive dating program. In terms of space, in relation to beach ridge location, Ipiutak house construction follows a normal distribution, densest in the middle two ridges (Mason 2006). Few of the hundreds of Ipiutak houses and graves are dated: seven ¹⁴C ages date the Point Hope Ipiutak settlement. Discarding the outlier solid carbon assays, nearly all Ipiutak village assays overlap between A.D. 600 and 900; although two samples may establish its initial settlement was as early as A.D. 200, with “abandonment” by A.D. 900 (Mason 2006). No direct stratigraphic or spatial overlap reveals continuity with the succeeding Thule culture at nearby Jabbertown, 10 km east, which dates as early as ca. A.D. 1000, and into the 13th century (Mason and Bowers 2009).

Southward to Kotzebue Sound, a Kivalina burial contained elaborate open-work carvings contemporaneous with Ipiutak at Point Hope, A.D. 600 and 900 (Stern et al. 2010). Over the early first millennium A.D., Cape Krusenstern supported eight Ipiutak “villages,” each with five to 14 houses, more “heavily populated than at any other time” (Giddings and Anderson 1986:116). In addition to the discrete villages, 35 isolated houses were located, and a myriad of tent rings. The chronology of Ipiutak occupation at Cape Krusenstern is lately better established following the comprehensive dating effort by Anderson and Freeburg (2013:60–65) that includes >40 assays on subsurface *Picea* charcoal from the Ipiutak ridges and 14 within seven houses, three previously dated by Giddings and Anderson (1986:30). Cape Krusenstern’s Ipiutak occupation centered between A.D. 400 and 650, very likely not centuries earlier, since an early age intercept, A.D. 135 to 425, from House 60 is now counter-indicated by four concordant ages A.D. 400–600 (Anderson and Freeburg 2013:65). Only House 18 offers an age estimate for a later, younger phase of Ipiutak at Krusenstern between A.D. 628 and 988 (Anderson and Freeburg 2013:55; Giddings and Anderson 1986:30). Beach Ridge 35, an early, high ridge, supported a large structure, 7 × 6 m, presumably a *qargi* (House 30); its age constrained between A.D. 392 and 562 (1590 ± 40 BP, Beta-223220, Anderson and Freeburg 2013:65). Ridge 35 was sufficiently impressive for its continued use as a cemetery for successive generations, not all Ipiutak (Giddings and Anderson 1986:146). The array of Krusenstern summer structures resembles the temporary use of Sisualik during late nineteenth-century trade fairs (Nelson 1899:260); possibly, Cape Krusenstern served a similar function. The year-long commitment of Ipiutak people to Cape Krusenstern is uncertain, given the few burials discovered by Giddings and Anderson (1986), although one had a substantial amount of grave goods, that of a hunter or warrior based on the thin, deadly lithics (more than 25) (Giddings and Anderson 1986:146).

On Seward Peninsula, Ipiutak occupation and its chronology is comparatively thin and late. Cape Espenberg witnessed an occupation A.D. 600 to 750 (Harritt 1994), while a few hunters deposited several arrow points within Trail Creek Cave (Larsen 1968). The Deering occupation is outsized because of the idiosyncrasies of its assemblage, not in the known number of graves ($n = 9$) or several houses; its original size remaining undetermined (Bowers 2009). The Deering qargi is dated by 10 assays, some on dog feces (Larsen 2001:30, 80), between A.D. 540 and 980, contemporaneous with a small nearby house (Bowers 2009) and of Burial 4, which contained the numinous maskoid (Mason 2009). A Deering Ipiutak cache produced evidence of earlier use, ca. A.D. 250 (Reuther in Bowers 2009:71). On the southeast margin, within Golovnin Bay, the Qitchauvik qargi was in use a century or two earlier, between A.D. 420 and 600 (Mason et al. 2007:62-63). At least some probability exists that *qargi* at both Deering and Qitchauvik were both employed during the sixth century A.D.

Interior Ipiutak settlements were of two contrasting modalities: central place aggregations, qargi, as discussed above, and small homesteads, often lakeside, useful for caribou drives, that supported only one to four houses: Hahanudan Lake (Clark 1977), Bateman (Reanier 1992), and Tukuto Lake (Gerlach and Hall 1988). The Hahanudan camp was occupied twice, in the fifth and sixth centuries A.D. and, later, in the seventh and ninth centuries (Clark 1977, Gerlach and Mason 1992:72). Two major caribou transit and intercept locales, Onion Portage and Anaktuvuk Pass, witnessed temporary encampments, dozens of tent rings, and short-term shelters. Band 2 at Onion Portage, attributed to a Norton-Ipiutak amalgam, contained two winter houses and over 100 stone-lined hearths, with four ages centered on A.D. 400 to 700 (Anderson 1988:113; Gerlach and Mason 1992:73). At Anaktuvuk Pass, XCL-351 Feature 25 is one of the few excavated and dated Ipiutak tent rings, recording a possibly early occupation between A.D. 245 and 540 (Mills et al. 2005:33).

Interior hunters had a high-mobility strategy and many Ipiutak excursions inland were for hunting caribou, across the entire Brooks Range, at its farthest limit a house at the Bateman site on Ikillik Lake, more than 1000 km inland (Reanier 1992). Ipiutak people did penetrate the boreal forest, where three households settled within dunes on Hahanudan Lake east of the Koyukuk River (Clark 1977:69), less than 50 km south from the Batza Téna obsidian outcrops. Aggregation occurred at several sites, especially in the Feniak Lake qargi in the western Brooks Range (Hall 1974) that was nearly contemporaneous with the Deering qargi, between A.D. 600 and 900 (Gal 1982:170-171; Lawn 1975:207-208). Anaktuvuk Pass was also a focus for Ipiutak hunters (Mills et al. 1999).

Some Ipiutak settlements, especially on Seward Peninsula, contain so few artifacts that only temporary, seasonal use seems likely. Cape Espenberg has only the aforementioned small encampments within low dunes across 2 km (Giddings and Anderson 1986:24; Harritt 1994), lacking diagnostic artifacts so that Hall and Gal (1995) doubted their attribution to Ipiutak. An Ipiutak occupation is limited to two surface-exposed burials lacking grave goods, and several side blades within three 16m² square houses, one with a 5 m long north entry (Harritt 1994:113-114). At Trail Creek Caves in interior Seward Peninsula, sheltering from poor weather to retool weapons, Ipiutak hunters discarded broken

antler-barbed arrowheads, side or end blades (Larsen 1968:34–35), evidence of seasonal mobility. An equally sparse Ipiutak occupation at Point Spencer, south of Bering Strait, revealed two spectacular objects—one, an iron ulu, and the other, a polar bear rake—but lacked architecture or burials, despite a 100m² excavation by Larsen (1979–1980). The absence of true Ipiutak villages or components at Wales, despite large excavations by Collins (in Dumond 2000) and Harritt (2014), may reflect a prehistoric boundary, a no neutral zone, between rival societies.

Mortuary Patterns

The Ipiutak attention to the dead is one of the hallmarks of the culture, second only to the practices of OBS people. Ipiutak burials occur adjacent to the coastal settlements, with 120 from Point Hope (Larsen and Rainey 1948), 19 across several Cape Krusenstern ridges, in or near houses (Giddings and Anderson 1986:356–359), 29 from Deering (Bowers 2009), two surface burials at Cape Espenberg (Harritt 1994), two from Tulaagiaq (Anderson 1978), and single graves from Kivalina (Stern et al. 2010) and Kotzebue (Shinabarger 2014).

Burials at Point Hope vary in construction and associated grave goods, with 15 discrete groups, with three clusters accounting for over half the graves, (Newton 2002, Mason 2006:109). The grave precincts vary in the amounts of armament and mystical capital. Graves were placed systematically, with power and influence affecting placement (Mason 2006:109). Multiple burials, often of an adult and a child, comprise 25 percent of interments at Point Hope, with a few multiple burials of four to six. Several burials contained a substantial quantity of weaponry, more than 25 arrowheads, likely for warfare (Larsen and Rainey 1948:225, 227, 231, 240, 244, 247). Burial 26 had an “unusually large” array with two bodies and 51 arrowheads (Larsen and Rainey 1948:231). Shamanic curing is evident from antler tubes above a child between the legs of Burial 21. Grave offerings that hold metaphysical properties are rare, although an association with children may be significant. One maskoid at Point Hope was placed atop the chest of a child buried at the knees of two adults, with few offerings in the log “tomb” (Larsen and Rainey 1948:240–241), while the other maskoid was essentially a cenotaph, also a significant practice. Ivory eyes, noseplugs, or loon skulls were employed as prophylactic devices, at both Deering and Point Hope. At the latter, particularly noteworthy are the antler “death masks” in B 107a and JB 22 or the mouth covers in Burials 8, 41, and 61 (Larsen and Rainey 1948:122, Plate 49). The fearsome Point Hope burial with the ivory eyes was not associated with other grave goods or even a wooden coffin (Larsen and Rainey 1948:236).

The 29 burials at Deering bore several with considerable accompaniments; two with more than 10 arrowheads and several with multiple, likely family-based, interments. Five young children were entombed together within Burial 4, seven in Burial 9, and eight in Burial 5 during three discrete episodes. Several sets of artificial jet eyes accompany Burials 2, 4, and 5 (Bowers 2009:Tables 7–5, 8, 13) while a small maskette

and obsidian flake were associated with Burial 9 (Bowers 2009:Table 7–15). The twin Burial 1 contained a diverse assemblage, in addition to the dozen arrowheads impaled in a young man's chest; chert end blades, an awl, salmon spear prong, ivory knives and knife handles (Bowers 2009:Table 7-3). The composite entombment Burial 4 contained the anthropomorphic maskoid, within a log coffin capped by schist slabs (Mason, in Bowers 2009; Mason 2009a).

The ultimate origins of Ipiutak mortuary practices may lie to the south within Cook Inlet or on Kodiak Island, considering the artificial eye-covers in Kachemak III burials, an “exotic burial ceremonialism” which occasioned Workman (1982:23) to speculate on southern affinities or a common Norton heritage.

WARFARE

The evidence for conflict in Ipiutak is unequivocal (Mason 1998, 2006, 2014). Two bodies had chert arrow points impaled in their skeletons: Deering Burial 1 one vertebra sustained a direct hit and its chest was associated with 15 arrow points, as well as two lances decorated with extraregional designs (Figure 18.1), likely of the perpetrators (Bowers 2009:152, 211; Mason 2009b:262). The chest of Burial 89 at Point Hope was also impaled (Figure 18.2) by an arrow point (Larsen and Rainey 1948:61, 243). At Cape Krusenstern, three burnt skeletons, one wounded in the pelvis, reportedly clutching an adze, digging to escape the flames from an attack on a house (Giddings and Anderson 1986:127). Inferential evidence of conflict includes a variety of weapons: bone daggers, clubs, extremely thin and painful barbed bone points, and the sheer number of “fish tail” stone points so useful in interpersonal violence (Maschner 2000). Lastly, several Point Hope bodies were possibly decapitated, as in Burial 89 (Larsen and Rainey 1948:242). Specialized shamanistic and military expertise was also evident in the amount of grave goods and in the spatial arrangement of the cemetery (Mason 2006).

IDEOLOGICAL ORIGINS OF IPIUTAK

The search for Ipiutak progenitors has followed the back-strap anthropogeographic approach of nineteenth-century, mostly Danish, scholars (cf. Larsen and Rainey 1948:157–161). The assumption is that its origin lay outside the Bering Strait region, based on the striking animal motifs and analogous Shang-dynasty “death masks” (Bandi 1964; Collins 1971). Ipiutak bears some resemblance to griffin-headed animals, open-work carvings from the Yamal Peninsula (Collins 1961:18), to the Ordos of north China, linked to the horse-riding, sacrificing Scythians (Collins 1971; Larsen 1952:27; Larsen and Rainey 1948:158; Schuster 1952:Figures 1–11). Jenness (1952:32) critiqued this thesis as “too weak to carry the superstructure of theory,” favoring a southern origin in the jade

eye-covers of the Han dynasty, 200 B.C. to A.D. 200, at least contemporaneous with the earliest Ipiutak. However, a single motif cannot be causative; a behavioral system (e.g., joint marking or purported X-ray vision of shamans) spread the motif: who and where were the Scythians that penetrated into Yakutia? The Scythian-origin model for Ipiutak persists, rekindled by the art historian Chatwin (in Bunker et al. 1970:147), as “the clearest example of an Asiatic people [entering] North America,” and further refined by Fitzhugh (2014:285), who envisions Ipiutak resulting from the “influence of Turkic-speaking reindeer-herding and horse-breeding peoples following the sixth century AD.”

A strong basis for an *ultimate* Eurasian origin for Ipiutak and/or OBS styles is the linkage with shamanism and psychotropic drug use (Mason 1998). Was drug-induced shamanism a late introduction into the Bering Sea world? The origins of Arctic shamanistic art are explored by Taylor and Swinton (1967): Swinton emphasized *praxis*, such as X-ray designs and joint-marking, while Taylor (1967:42) postulated a deep common ancestry of both Dorset and Ipiutak within the Arctic Small Tool tradition ASTt. If the Ipiutak iconography were a late entry into Alaska, following Larsen’s, Jenness’s or Fitzhugh’s (2014:285) views (“the spread of a new religious culture”), then, Ipiutak or OBS represents the introduction of esoteric knowledge, passed from shaman to mentor *across* ethnic and linguistic boundary lines. This transmission resembles the spread more of a new religion than of a *mere* esthetic style, confounding the prevalent cultural historical perspectives in Alaska. Further, does religion spread innocently or does it follow the sword or arrow? Is the shaman’s power tied to military power? Was Point Hope coerced by OBS societies who imposed a new ideology its Norton inhabitants?

In support of a southern Alaska origin, based on mortuary (e.g., Workman 1982) or military (Maschner 2000) practice, the qargi’s development equates with male ascendance, manifested in shamanic activity. South of Bering Strait, present Yupik territory, a large structure was constructed on Nelson Island, near the Yukon Delta, as early as 250 B.C. (Okada et al. 1982:9). Along eastern Norton Sound, Norton people constructed a sizable log-walled qargi at Unalakleet (Lutz 1972:67), occupied by the first century A.D., still used in the seventh century A.D., contemporaneous with Ipiutak occupations at Golovin Bay and Deering. Inland, the Desperation Lake qargi, 12 m long, is possibly even earlier (Irving 1962:81), although its age is so imprecise (1830 ± 170 B.P. [Gal 1982:172]), between 203 B.C. and A.D. 580) rendering a late sixth-century age not improbable.

FATE AND SIGNIFICANCE OF THE IPIUTAK CULTURE

Ipiutak was a culture informed by shamanic beliefs whose people gathered within community halls (qargi) for cultic performances, maintained an extensive trade network, and warred with their neighbors. Status was ascribed: young children, especially, were interred with numinous objects; only one of which is dated, ca. A.D. 800. This age is late in the

development of Ipiutak, so that any developmental scenarios are speculative. No Ipiutak components are younger than A.D. 900, which implicates a sudden event in its termination: Conquest? Migration? Famine? Was the Ipiutak art style apocalyptic, a crisis cult associated with social turbulence? The retreat from the common shaman forum implies a loss of cosmic currency in the face of either political or climatic catastrophe. Across northwest Alaska, Ipiutak was followed by a century's hiatus, until the appearance of the Thule culture, borne by the ancestors of the modern Inuit (Mason, this volume, chapter 20).

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CHAPTER 19

ANCIENT ESKIMO CULTURES OF CHUKOTKA

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ARCHAEOLOGICAL sites located in the coastal regions of Chukotka first attracted the attention of researchers as early as the end of the eighteenth century. However, systematic excavations there began later, in the middle of the 1940s (Okladnikov and Beregovaya 2008 [1971]; Rudenko 1961 [1947]). After this time, sites of one Paleoeskimo and several Neoeskimo cultural traditions were revealed on the coasts of Chukotka.

The Paleoeskimo cultural tradition, discovered by Nikolai N. Dikov in 1975, acquired the name “Wrangel.” Up to the present, it is represented by a single site, Chertov Ovrag, on Wrangel Island in the Arctic Ocean. During the course of excavations of this site a large number of stone tools were found, as well as several artifacts of walrus tusk, including a toggling harpoon head (Dikov 2003 [1977]). In the opinion of the archaeologists who conducted investigations at Chertov Ovrag, the form of the harpoon head (Figure 19.1:1) permits placing the Paleoeskimo culture of Chukotka close to the Paleoeskimo cultures of North America, Old Whaling (Cape Krusenstern, Alaska) and Independence (Peary Land, Greenland). In chronological regard, the site on Wrangel Island is also fully comparable with these archaeological cultures: it existed during the period from 1700 to 1400 B.C.¹ Also pointing to the similarity of the Wrangel culture with Paleoeskimo cultures of Alaska and Greenland are the stone tools from Chertov Ovrag. At the same time, a definite similarity to the stone tools from more southern areas of Northeast Asia—Kamchatka and the Okhotsk coast—can be traced in them (Dikov 2004 [1979]).

Judging by the find of a toggling harpoon at Chertov Ovrag, the Paleoeskimos of Chukotka were well acquainted with sea-mammal hunting. This conclusion is supported by the bones of seal, walrus, and bearded seal found during excavation. At the same time, analysis of the faunal materials indicates that the chief object of procurement by the inhabitants of the site were geese. Based on these data, as well as on the absence at

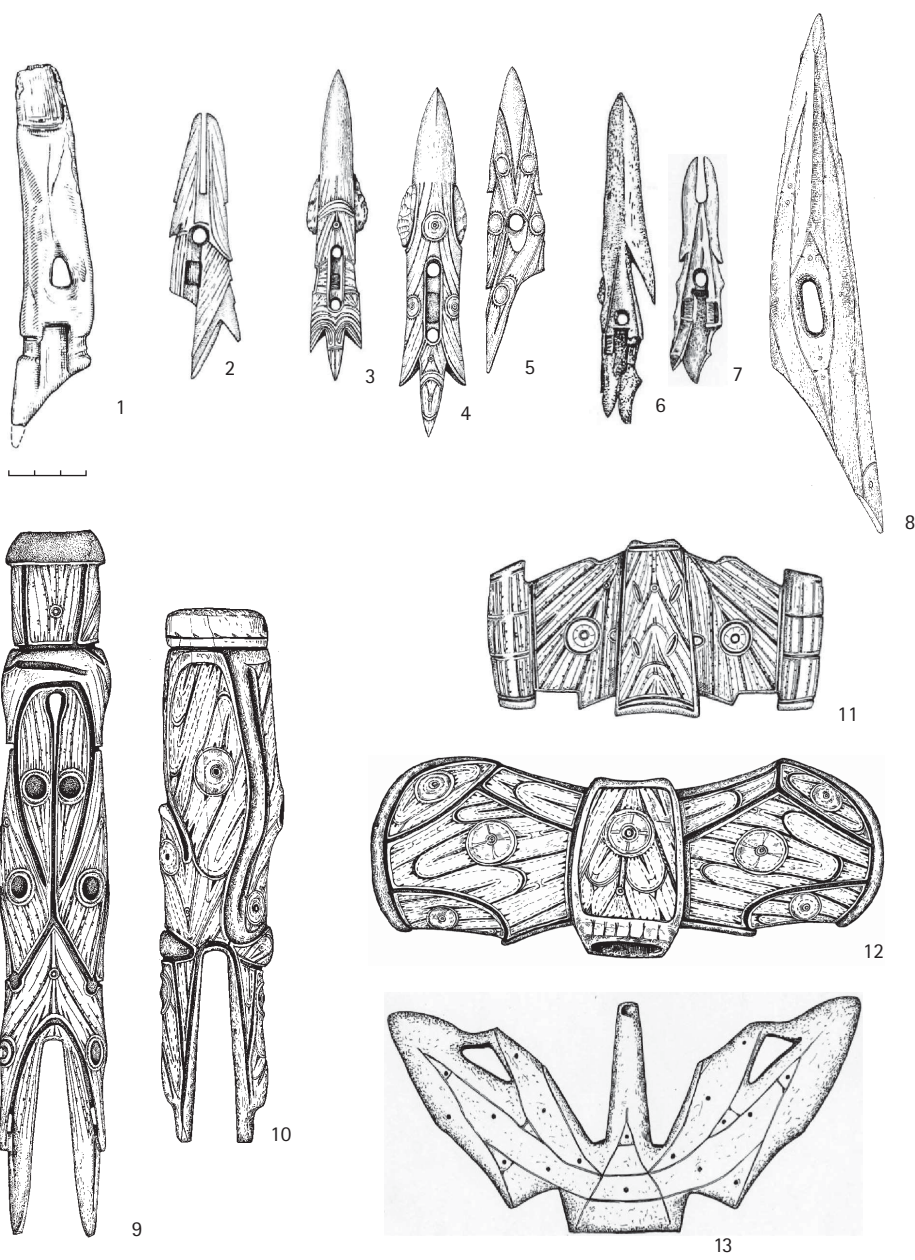


FIGURE 19.1 Harpoon implements from Wrangel Island and Ekven. (1) Wrangel Paleoeskimo culture: Wrangel Island, Chyortov Ovrage site, L 16.5 cm; (2) Okvik: Ekven cemetery, burial 250, L 11.0 cm; (3) OBS I: Ekven cemetery, burial 255, L 13.3 cm; (4) OBS II: Ekven cemetery, burial 300, L 15.1 cm; (5) OBS III: Ekven cemetery, surface material, L 13.3 cm; (6) Birnirk: Ekven settlement, house H-18, L 14.4 cm; (7) Birnirk: Ekven settlement, house H-18, L 9.7 cm; (8) Early Punuk: Ekven settlement, house H-18, L 22.2 cm; (9) OBS I: Ekven cemetery, burial 284, L 25.9 cm; (10) OBS II–III: Ekven cemetery, burial 302, L 20.7 cm; (11) OBS I: Ekven cemetery, burial 284, L 12.0 cm; (12) OBS II–III: Ekven cemetery, burial 302, L 19.0 cm; (13) Early Punuk: Ekven cemetery, burial 319, L 17.3 cm. (1, 5, 8–13) walrus ivory; (3–4, 6) walrus ivory and stone; (2, 7) antler.

Drawings by Nina Survillo

Chertov Ovrage of the remains of dwellings, Dmitri V. Gerasimov, Evgeny U. Giryay, and Alexei N. Tikhonov expressed the supposition that this archaeological site “can be interpreted as a temporary camp of a small group of hunters,” who hunted geese during their molting period (Gerasimov et al. 2003).

The conclusion that bird hunting played an important role in the economic activity of the people who left the Chertov Ovrage camp does not contradict the conclusion that they were Arctic sea-mammal hunters. Birds always made up a notable part of the hunting procurement of early Eskimos, and the size of this share depended on the abundance of the birds. Thus, the results of excavations on Wrangel Island permit Chukotka to be considered as one of the areas of Paleoeskimo cultural tradition.

It can also be supposed with a large degree of probability that the extent of this area was quite significant. It is unlikely that hunters who procured molting geese in the area of Chertov Ovrage arrived on Wrangel Island directly from the shores of Bering Strait. They were most probably residents of Paleoeskimo villages unknown to us, which were situated either on the island itself or on the nearest mainland shores of Northeast Asia.

The Neoeskimo cultural tradition is represented in Chukotka incomparably more fully than the Paleoeskimo. The earliest Neoeskimo sites of Chukotka's shores belong to the subculture OBS I, which, owing to the American archaeologist Henry Collins, we suggest as the most archaic of the presently known typological variants of the Old Bering Sea culture. This subculture—early Old Bering Sea—initially discovered on St. Lawrence Island and the Punuk Islands and represented in several archaeological sites on the mainland shore of Alaska, occupied, as the investigations of Sergei I. Rudenko, Maxim G. Levin, Sergei A. Arutiunov, and other Russian researchers have shown—a vast territory in Chukotka. Artifacts with the graphic design of OBS I are encountered in various regions of the Chukchi Peninsula: from its southern coast to the northeast extremity (Dikov 2003 [1977]; Rudenko 1961 [1947]).

The most complete idea of the early Old Bering Sea culture of Chukotka is provided by materials from the Ekven and Uelen cemeteries situated near Cape Dezhneva.² These are especially Ekven Burials 37–38, 40, 42, 63, 68, 204, 220, 238, 250, 251, 255, and 284 (Figure 19.1:3, 9, 11; Figure 19.2:7, 11), and Uelen Burials 14–15(58), 6(59), 16(59), 17(59), 20(59), and 23(59) (Arutiunov and Sergeev 2006 [1969], 2006 [1975]; Bronshtein et al. 2007; Leskov and Müller-Beck 1993). The earliest of them can be dated, in our view, to the end of the first millennium B.C., the latest to the sixth to seventh centuries A.D.

Judging by the character of the finds in these burials, early Old Bering Sea people were predominantly occupied with sea-mammal hunting. The chief object of their hunt was ringed seals, bearded seals, and walruses. The bearers of OBS I also hunted whales, especially yearling gray whales, but whale hunting probably played less of a role in their economic activity than in the typologically later variants of Old Bering Sea—OBS II and OBS III. This conclusion is drawn particularly on the basis that the harpoon heads of OBS I were inferior in their dimensions to the heads of middle and late Old Bering Sea.

The social relations in the communities of early Old Bering Sea people were rather complex. For example, the burial inventory of Ekven Burial 204 contained 365 items, many of which had a ritual assignment.³

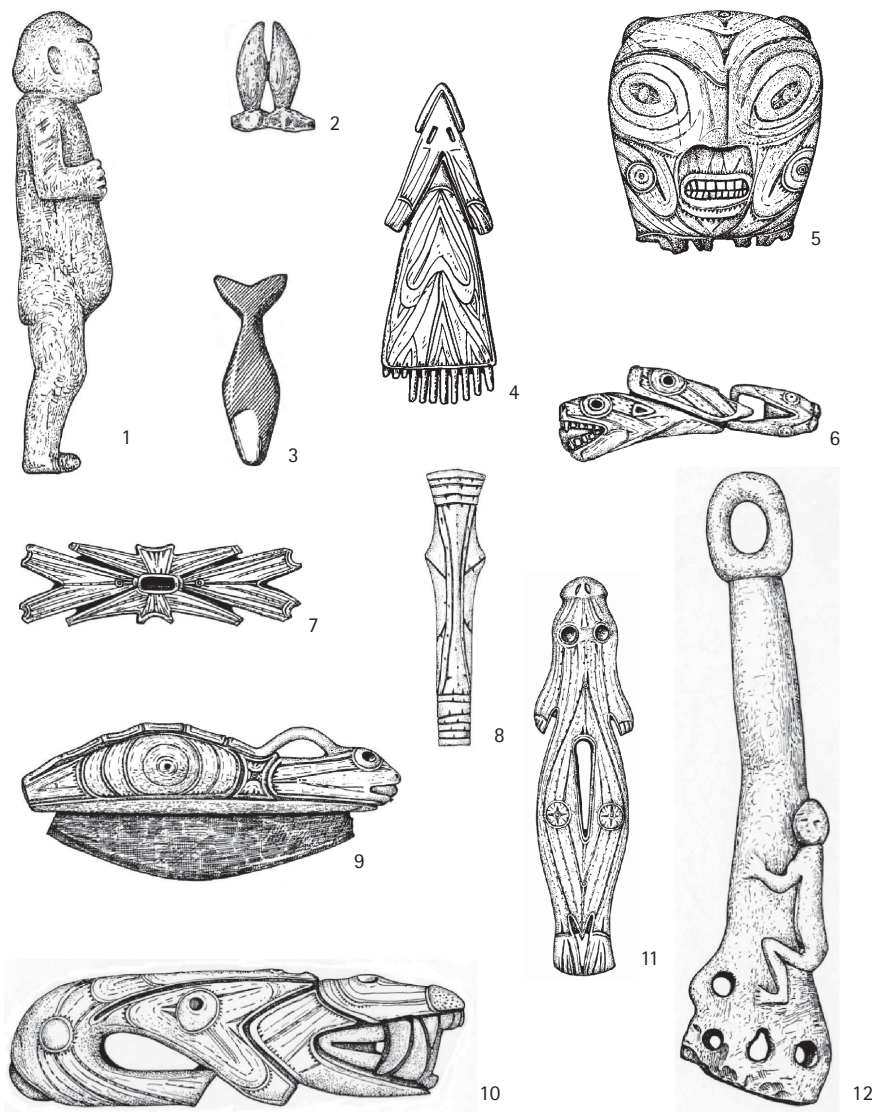


FIGURE 19.2 Ritual objects, ornament, and tools from Ekven. (1) Female figure, OBS II: Ekven cemetery, Burial 229, H 14.0 cm; (2) object in the form of two whales, Early Punuk: Ekven settlement, House H-18, L 3.0 cm; (3) whale figure, OBS III: Ekven cemetery, Burial 285 A, L 5.7 cm; (4) ritual comb, OBS II: Ekven cemetery, Burial 222, L 9.8 cm; (5) ritual trough, OBS II–III: Ekven cemetery, Burial 304, L 7.5 cm; (6) burin handle, OBS II–III: Ekven cemetery, Burial 309, L 7.8 cm; (7) ornament, OBS I: Ekven cemetery, Burial 251, L 8.4 cm; (8) needle case, Early Punuk: Ekven cemetery, Burial 252, L 8.4 cm; (9) ulu knife, OBS II–III: Ekven cemetery, Burial 313, L 11.5 cm; (10) zoomorphic figure, OBS II: Ekven cemetery, Burial 234, L 13.2 cm; (11) seal figure, OBS I: Ekven cemetery, Burial 220, L 13.5 cm; (12) mattock handle, OBS III or Early Punuk (?): Ekven cemetery, Burial 319, L 21.0 cm.

(1, 3–8, 10–12) walrus ivory; (2) wood; (9) walrus ivory and stone.

Drawings by Nina Survillo

The religious ideas of the bearers of OBS I were also complex. This is attested to by anthropomorphic and zoomorphic sculptures of walrus tusk found in the Ekven and Uelen cemeteries. The artistic features of these works are of great interest. Real and fantastic traits are organically combined in them. The early Old Bering Sea people also possessed in perfection the art of creating decorative graphic compositions. Their decoration on artifacts of walrus ivory consisted of concentric circles, single and double straight lines, and always included such specific motifs as triangles or “teeth,” scarcely distinguishable with the eye, arranged in checkered order.

The OBS I subculture, in the form that appears before us in archaeological sites of the Chukchi Peninsula, was undoubtedly formed as a result of long-preceding development. However, the present level of knowledge does not permit either tracing the process of its formation or finding any similarity in it with the Paleoeskimo culture of Wrangel Island.

Practically the same can be said about another Neoeskimo archaeological culture—Okvik—isolated sites of which have been found on the mainland shore of Chukotka.⁴ Inasmuch as the number of Okvik finds is not great, our ideas about the origin and evolution of this tradition remain in many ways hypothetical. We can judge Okvik in its “Chukotka variant”—in addition to Chukotka, it extended to St. Lawrence Island and the Penuk Islands—based primarily on finds from the Uelen and Ekven cemeteries. At Uelen, Okvik proper can be considered to be represented at Burial Complexes 18(57) and 2–3(59); at Ekven, Burial 260. Individual Okvik artifacts were found also in Ekven Burials 7, 113, 130, 204, 250, and 274 (Arutiunov and Sergeev 2006 [1969], 2006 [1975]; Bronshtein et al. 2007; Leskov and Müller-Beck 1993). Radiocarbon dates of several Ekven burials permit viewing the boundary of our era (A.D. 1) as the lower chronological boundary of Okvik, and the middle of the first millennium A.D. as the upper boundary, that is, practically the same period that the subculture OBS I existed on the Chukotka coast. Representatives of both cultural traditions, judging by available data, were in contact with each other.

Comparative analysis of the archaeology attests to the fact the Okvik, like the bearers of OBS I, predominantly hunted pinnipeds, but their harpoon equipment was inferior to the equipment of the early Old Bering Sea people. In distinction from the latter, the Okvik people most probably did not use harpoon stabilizers (“winged objects”). Okvik harpoon heads were more uniform in size and less complex in form. They had only one hole for the line, and not two, as was usual for OBS I, and they were equipped exclusively with stone end points, whereas the harpoon heads of early Old Bering Sea peoples included artifacts with both end points and lateral stone insets (Figure 19.1:2, 3).

Okvik graphic design on walrus ivory artifacts also consisted of fewer components than the OBS I style. As a rule, these were straight single lines and short segments (Figure 19.1:2). At the same time, highly artistic sculptures of walrus tusk, covered with Okvik graphic design, were found at Uelen and Ekven. In one of them, stylistic similarity with Okvik anthropomorphic plastic art from St. Lawrence Island and Penuk Islands can be distinctly traced (Bronshtein and Shirokov 2008:38–39, Figure 57). This circumstance can be viewed as an argument in favor of the hypothesis of Sergei A. Arutiunov

and Dorian A. Sergeev that Okvik was an isolated, island variety of the Neoeskimo cultural tradition. According to this hypothesis, Okvik culture was formed on islands in the southern part of Bering Strait and was carried to Chukotka by settlers from St. Lawrence Island (Arutiunov and Sergeev 2006 [1969]:28).

In the first half of the first millennium A.D., in the shore zone of Northeast Asia, another local Neoeskimo tradition appeared—OBS II, middle Old Bering Sea. It was the next typological variant of the Old Bering Sea culture. The area of OBS II on the Chukchi Peninsula included all of its coast—southern, eastern, and northern (artifacts of the middle Old Bering Sea people were also found on St. Lawrence Island and the Diomed Islands), and the period of distribution probably embraced no less than six to seven centuries: from the second to the eighth centuries A.D. The basic “type” sites of OBS II can be considered those investigated by Nikolai N. Dikov in the 1960s and 1970s—cemeteries on Cape Chini on the eastern shore of Chukotka, as well as Uelen Burials 3(58), 4(58), 7(58), 7(59), and 4(60), and Ekven Burials 7, 10–11, 130, 154, 216, 222, and 234 (Arutiunov and Sergeev 2006 [1969]; 1975; Bronshtein et al. 2007; Dikov 2002 [1974], 2003 [1977]; Leskov and Müller-Beck 1993).

The results of archaeological excavations permit us to confidently state that the OBS II subculture was closely connected genetically with early Old Bering Sea. The harpoon heads, heads of harpoon shafts, and harpoon stabilizers, which the middle Old Bering Sea people used, especially in the first centuries of our era, had almost the same form as the hunting equipment of the bearers of OBS I (Figure 19.1:3–4). Much in the burial ceremony, the stone industry, and the ivory-carving art of the middle Old Bering Sea people can be traced in common with OBS I.

However, in spite of the obvious similarity of both traditions, they differ in several features important to people of the distant past. For example, the design of OBS II, in which the small “teeth” characteristic for OBS I are absent, includes a number of linear components that were not used by early Old Bering Sea people. Despite this, both decorative styles are quite often found in the same burial. The differences in decorations permit us to suppose that early and middle Old Bering Sea people, who existed synchronically and practically in the same area for a long time, considered themselves representatives of different local (ethnic or subethnic?) communities.

Today we have no answer to the question of what brought about the formation of a new local subdivision in the sphere of early Old Bering Sea people, but there is good reason to suggest that the bearers of OBS II raised the culture of sea-mammal hunters of Chukotka to a higher level of development. The harpoons with OBS II design on the whole exceed in size the harpoons of early Old Bering Sea people, which probably points to an increased role of whale hunting. Communities of middle Old Bering Sea people had a more complex social and property structure, and their communities contained more people who carried out ritual, probably shamanic, functions.

The small figurative art of middle Old Bering Sea people is most likely the brightest page in the history of ivory carving of Bering Strait. Sculpted compositions, executed by the bearers of OBS II, are considered in our day genuine masterpieces of the world's primitive art (Figure 19.2:1, 3, 4, 10; Figure 19.3:10). It was the middle Old Bering Sea people



FIGURE 19.3 Hunting gear and ritual objects from Paipelghak. (1) Harpoon head, Birnirk House: Room 1, L 13.5 cm; (2) harpoon head, OBS II: Room 4, L 7.6 cm; (3) harpoon head, OBS II: Room 4, L 6.7 cm; (4) harpoon head, OBS II: Room 4, L 6.5 cm; (5) bear figure, OBS or Birnirk House (?): Room 2, L 4.2 cm; (6) bird figure (?), OBS: Room 4, L 4.2 cm; (7) harpoon counterweight, OBS II: Room 4, L 8.5 cm; (8) harpoon counterweight, OBS II: Room 4, L 16.4 cm; (9) zoomorphic figure, Birnirk House: passage from Room 4, L 4.5 cm; (10) anthropomorphic figure, OBS: Room 4, H 18.6 cm; (11) zoomorphic figure, OBS: Room 2, H 9.0 cm; (12) anthropomorphic figure, Birnirk House: Room 2, H 9.7 cm; (13) prong, OBS III: Room 4, L 11.6 cm; (14) snow goggles, OBS or Early Punuk (?): Room 2, L 13.1 cm; (15) snow goggles, OBS or Birnirk House (?): Room 2, L 12.5 cm; (16) runner from a ritual sledge, OBS I: Room 4, L 33.8 cm. (1–3, 5–9, 11, 13–16) walrus ivory; (4) walrus ivory and stone; (10) wood; (12) bark.

Drawings by Nina Survillo

who became the first early Eskimos of Chukotka to create polyiconic sculpture. Each such work is to some degree a cryptogram: the subject of the image depends on the angle at which the viewer examines it (Figure 19.2:10). Thus, for example, by turning the sculpture of the figure of a woman, it turns into a female walrus with a baby walrus; the beak of a bird becomes a part of a bear's head (Arutiunov and Sergeev 2006 [1975]; Leskov and Müller-Beck 1993). OBS II design, in comparison with typologically earlier OBS I and typologically later OBS III, as well as in comparison with other early Eskimo ornamental styles (Okvik, Birnirk, early Punuk), had the richest set of motifs and compositional resolutions.

The building technologies of middle Old Bering Sea people are very interesting. Until recently there was no reliable information about their dwellings. During the course of archaeological excavations conducted starting in 2002 at the settlement of Paipelghak on the north shore of Chukotka close to the mouth of the Chegitun River, one of the authors of the present article succeeded in finding a dwelling that belonged to the bearers of OBS II.⁵ It was situated on the lower horizon of dwelling complex H-1 (House 1) and was a frame structure, almost square in plan, built of driftwood, whale bones, and sod. The area of the structure amounted to about 9 m². In the wall facing the sea was an entryway in the form of a corridor. The floor in the living area was covered with stone slabs. When there had been subsidence of the stones, new slabs had been placed on top of them. Small stone slabs 30 to 40 cm long were also used as "plinths": set vertically they framed the lower part of the walls. Wooden posts set around the perimeter of the room served as roof supports. The builders of the dwelling complex also used wood for construction of a small "cellar"—a half-meter triangular pit excavated by one of the walls. The "cellar" had an earthen floor; its walls were made of logs. When the builders had placed a new layer of slabs on the floor of the dwelling, the wooden walls of the "cellar" were built up.

Excavations at Paipelghak provide an idea of how middle Old Bering Sea people remodeled their dwellings. With time they filled the former entry corridor and replaced it with a new one that ran parallel to the old one. They also built a light addition with an earthen floor, which apparently did not have warm walls.

The complex ethnocultural situation—which formed in Chukotka during the first half of the first millennium A.D., when the OBS II subculture coexisted, as was noted above, with OBS I and Okvik—had become a large mosaic by the end of the evolution of middle Old Bering Sea. During this chronological period, presumably in the sixth to eighth centuries A.D., three new cultural traditions appeared on the shores of the Bering Sea and the Chukchi and East Siberian Seas. One of them was the next typological variant of the Old Bering Sea culture—OBS III (late Old Bering Sea); two others, Birnirk and early Punuk, were independent cultures.

As "type" sites of OBS III in Northeast Asia (besides existing in Chukotka, late Old Bering Sea, like Birnirk and early Punuk, appeared on St. Lawrence Island and in Alaska), we propose assigning burials from the Uelen and Ekven cemeteries. At Uelen these are Burials 5(57), 10–11(57), and 2; at Ekven—Burials 3–6, 9, 12, 43, 44, 45, 46, 49, 55, 103, 115, 133, 136, 150, 157, 161–162, 173, 176, and 183–184 (Arutiunov and Sergeev 2006

[1969], 2006 [1975]; Dikov 1967; Leskov and Müller-Beck 1993). Ekven Burials 285, 302, 303, 304, and 320 (Bronshstein et al. 2007; Leskov and Müller-Beck 1993) are also very interesting. Judging by the features of the sculptural and graphic design on items of hunting equipment, these burials can be considered “transitional” from OBS II to OBS III (Figure 19.1:5, 10, 12; Figure 19.2:5–6, 9).

A study of the finds from the enumerated archaeological complexes provides the possibility of composing a rather complete idea about how the subculture being examined emerged and developed. The creators of OBS III were highly specialized maritime hunters. The procurement of sea mammals probably had somewhat greater significance for them than for the bearers of the typologically earlier cultural traditions. Pointing to this is the reduction in the number of arrows in the burials of OBS III in comparison with burials of OBS II and especially OBS I. (Arrows were most probably used by early Eskimos primarily for hunting tundra animals). It is also possible to rather reliably suppose that the harpoon equipment of the late Old Bering Sea people, frequently greater in dimension than the hunting equipment of their predecessors, provided the possibility of conducting a more effective whale hunt.

Several arguments can be cited to support the hypothesis that the bearers of OBS III were in a greater degree whale hunters than early and middle Old Bering Sea people. The most archaic sculpted images of whales were found in Chukotka in burials of OBS III (Figure 19.2:3). Late Old Bering Sea people more often used whale bones for construction of burials. They had more group burials and richer ones that contained the remains of three or more people. This circumstance, from our point of view, points to the tightening of intrafamily connections, which apparently was a consequence of the formation in communities of late Old Bering Sea people of more numerous production teams, the need for which grew with the development of whale hunting.

Indirect evidence that late Old Bering Sea people possessed a more powerful economic base than bearers of the other typological variants of the Old Bering Sea culture can be seen in the size of the territory occupied by OBS III. Its area exceeded the areas of early and middle Old Bering Sea: the artifacts with OBS III design, which consists chiefly of continuous and broken curved lines (Figure 19.1:5), are found on the north and south coasts of Chukotka, hundreds of kilometers from Bering Strait (Dikov 2003 [1977]; Rudenko 1961 [1947]).

The more highly developed specialization of OBS III in whale hunting, in comparison with OBS I and OBS II, became, in our view, the basic prerequisite for separating late Old Bering Sea people into an independent subcultural community. Incidentally, in spite of the evident attainments of this indisputably clear cultural tradition, it disappeared rather quickly from the historical scene, having “dissolved,” as will be shown below, at the boundary of the first and second millennia A.D. in Birnirk and early Punuk.

Birnirk, as we already noted, started to spread on the Chukotka coast simultaneously with OBS III—in approximately the sixth to eighth centuries A.D. The bearers of the Birnirk cultural tradition were primarily pinniped hunters. Later they also began to hunt whales, but hunting these animals evidently remained on the periphery of their economic activity. In Chukotka, representation of Birnirk is provided chiefly

by sites examined by Aleksei P. Okladnikov in 1946 (Okladnikov and Beregovaya 2008 [1971]) near Cape Baranov, the upper layers of the above-mentioned Dwelling H-1 at Paipelghak (Dneprovsky 2006), and several burial complexes at the Uelen and Ekven cemeteries (Arutiunov and Sergeev 2006 [1969], 2006 [1975]; Dikov 1967). At Uelen these are especially Burials 4(57), 6(57), 17(57), 10, and 11; at Ekven, Burials 125, 126, 135, 153, 163, 167, 189, and 278. The region of distribution of Birnirk in Northeast Asia was thus quite extensive, from Cape Dezhneva to the mouth of the Kolyma, and, just as in Alaska, embraced predominantly the coast of the Arctic Ocean.

The Birnirk materials discovered in Chukotka confirm the idea that Birnirk people were the bearers of a specific variant of Neoeskimo maritime culture, oriented toward especially severe natural conditions. A significant proportion of the Birnirk harpoon heads found by Russian archaeologists are harpoons with a large lateral barb, which were intended for striking seals in the head, that is, for hunting at breathing holes in a sea completely covered by ice (Figure 19.1:6; Figure 19.3:1). The scantiness of the burial inventory of Birnirk people is striking, which most probably points to the rather ascetic form of their life. The asceticism of this cultural tradition is also attested by the ivory-carving art. Birnirk sculptures are miniature, extremely tentative zoomorphic images, and their graphic design consists of a limited set of laconic linear motifs (Figure 19.3:5, 9).

The existence among the Birnirk people of two types of burial ceremony also attracts attention. One of them was the same as among representatives of other Neoeskimo traditions: the deceased were placed in a burial pit in an extended position. The other was burial in a flexed position. Of the Birnirk burials at Uelen and Ekven cemeteries, the flexed burials make up about 40 percent. Thus, it is not out of the questions that the Birnirk cultural community of Chukotka included two large local (ethnic?) subdivisions.

Archaeological investigations in the northeastern extremity of Asia have introduced into scientific circulation a large amount of data on the dwellings of the Birnirk people. Thus, particularly valuable information about the structural technology used during Birnirk was obtained during the course of recent excavations of the upper layers of the above-mentioned dwelling complex H-1 at the settlement of Paipelghak (Figure 19.4).⁶ The Birnirk dwelling at Paipelghak consisted of two living spaces joined by a passage and a corridor entryway. The living spaces were rectangular in plan, with areas of about 12 and 16 m², respectively. A passage a little more than four meters long and about a meter wide joined them; the height of the passage was on the order of 110 cm. The corridor by which they left and entered the dwelling had a length of more than six meters and led toward the sea. Besides the corridor entryway there was another one which, judging by the absence of a cover, was used only during the warm season.

The walls of the dwelling were formed primarily of driftwood—tree trunks (logs), placed horizontally on each other and flattened slabs (boards) set vertically around the exterior. Between the third and fourth logs there was a gap filled with whale vertebrae and pieces of wood. On the outside and inside of the corners of the living spaces were set wooden posts, which served both for strengthening the walls and also apparently for



FIGURE 19.4 Paipelghak Settlement, Birnirk House: passage between two rooms.

Photo by Kirill Dneprovsky

roof support, which, judging by isolated finds, could include beams of whale bones. The floor in the living spaces was paved with wooden slabs. On the floor in the corridor lay a large scapula of a bowhead whale and slate slabs; its level was 40 to 50 cm lower than that in the living spaces.

In the course of studying the Birnirk layers in Paipelghak Dwelling H-1, fragments of ceramic oil lamps were found. Beyond the outer wall of one of the living spaces (the large one) a large ash stain and traces of a fire were revealed. The hearth outside the house probably served not just for preparing food, but also for heating the house. In this place, where the hearth was adjacent to the dwelling, a slate slab about 50 cm high served as a wall. When heated on the outside, it transmitted heat into the living space. Inasmuch as the wooden posts that supported the wall were located directly by the slabs, there were traces of fire, and remodeling could be seen in the living space; it can be supposed that one time a fire broke out, after which the inhabitants of the house, having restored it, discontinued such a system of heating.

Reconstructing the methods of construction used by the Birnirk people can also be supported by the data from Ekven Dwelling H-18 (Bronstein and Dneprovsky 2001:587–619). It was excavated between 1995 and 2002 by an archaeological expedition from the State Museum of Oriental Art, during which scholars from several European countries and Canada worked with Russian archaeologists. H-18 is not just a Birnirk site but also early Punuk (Figure 19.1:6–8).⁷ However, many structural details of this complex are so close to that described above that we apparently are correct in viewing them as characteristic for the Birnirk people (Figure 19.5).



FIGURE 19.5 Ekven Settlement, Birnirk–Early Punuk House (H-18).

Photo by Kirill Dneprovsky

Almost the same as at Paipelghak, the Ekven Dwelling H-18 was built of driftwood, whale bones, and sod, and consisted of two joined living spaces, a corridor entryway, and two open areas in which there were hearths and pits for preserving food. The living spaces were rectangular in form. The area of one of them was a little more than 20 m²; the area of the other, 9 m². The larger living space was built on the level of the old ground surface; the floor of the smaller living space was 30 to 40 cm higher, on the back dirt. In the passage between them there was a step formed of wood slabs. The corridor entryway (located in the large living area and oriented in the direction of the sea) was six meters long and about a meter wide. The level of the floor in the corridor was 60 to 100 cm lower than in the living spaces. Open areas, with a total area of more than 30 m², were located beyond the south and east walls of the dwelling. Special entryways led into them from the large living space. The residents of H-18 in all probability used them during the summer months. The areas were located on the level of the ancient ground surface and were paved with whale scapulae and vertebrae, as well as stone slabs. Large slate slabs one to one and a half meters long also lay on the floor in the living spaces.

Paipelghak Dwelling H-1 and Ekven H-18 contain valuable information not only about the construction technologies of the Birnirk people, but also about their relationship with Old Bering Sea and early Punuk peoples. Judging by the materials from Paipelghak, the Birnirk living complex was arranged directly over the structure of the middle Old Bering Sea people and in fact was constructed on the ruins of their dwelling. It is thought that such a situation could occur only if the Birnirk people perceived the OBS II people as a related group. A similar picture is observed at Ekven, where in Dwelling H-18 representatives of both Birnirk and early Punuk cultures lived, and probably at the same time. We note that among the finds from H-18 there are also individual artifacts of Old Bering Sea origin.

Other sources also point to close connections of the Birnirk people with Old Bering Sea and early Punuk peoples. Artifacts characteristic for OBS II, OBS III, Birnirk, and early Punuk are frequently found in the same burials at the Ekven and Uelen cemeteries. The clearest examples of such burial complexes are Ekven Burials 5, 18, 44, 52, 92, 143, 168–169, 170–171, 183–184, and 187, and Uelen Burials 4(57), 17(57), 12(58) (Arutiunov and Sergeev 2006 [1969], 2006 [1975]).

More than 40 years ago, the Swiss archaeologist Hans-Georg Bandi expressed the idea that at the beginning of the second millennium A.D. a syncretic Birnirk-Punuk cultural community emerged in Chukotka (Bandi 1969:198). The most recent archaeological research supports this hypothesis with two essential clarifications. In our view, this tradition was even more complex and included components of the Old Bering Sea culture, and the time of its existence embraced not just the beginning of the second millennium A.D., but also the preceding period—the end of the first millennium A.D. It is also important for us to note that during the several centuries of its existence the Old Bering Sea–Birnirk–Punuk community was noticeably transformed: first the Old Bering Sea became less clear in it, and then the Birnirk features, and correspondingly the features of the early Punuk were strengthened.

The early Punuk tradition—an archaic variant of the strong Thule-Punuk whaling culture that spread by the middle of the second millennium A.D. throughout the vast extent of the Asian and American Arctic coastal expanses—is represented in Chukotka by a large number of isolated finds. At the same time, comparatively few early Punuk archaeological complexes proper have been examined in Northeast Asia. The most informative of them are the Ekven Burials 14, 99–100, 129, 144, 155–156, 158, 212, 240, 252, and 319 (Figure 19.1:13; Figure 19.2:8, 12) (Arutiunov and Sergeev 2006 [1975]; Bronshtein et al. 2007; Leskov and Müller-Beck 1993). The above-described Ekven Dwelling H-18 can also be tentatively assigned to the early Punuk complexes of Chukotka.

In most sites of early Punuk, large “bullet-shaped” harpoon heads were discovered, intended, judging by the size, for hunting whales. We note also that early Punuk people, more often than representatives of other Neoeskimo traditions, including OBS III, used whale bones in the construction of burials. Practically all of the above-enumerated early Punuk burials had a frame of whale bones, and the paired Burial 99–100 included not just the usually used mandibles, scapulae, and ribs, but also the skull of the whale. The large role whale hunting played in the life of the early Punuk people is attested also by the miniature figurines of whales found in Dwelling H-18, including a sculpture of wood, which represented two of these animals at the moment of mating (Figure 19.2:2) (Bronshtein and Dneprovsky 2001:601, Figure 8:7).

The composition of the burial inventory from early Punuk burials indicates that the bearers of the subculture being examined, besides hunting whales, took pinnipeds and birds, and hunted polar bears. The polar bear was probably one of the chief personages in the mythology of the early Punuk people. In their burials, sculpted images of this animal, carved of walrus tusk, are often encountered.

The early Punuk small plastic art of zoo-, ornitho-, and anthropomorphic images and the graphic design consisting of fine lines, dots, and triangles are a valuable source for

reconstruction not only of the spiritual but also the social culture of Chukotka whale hunters at the boundary of the first and second millennia A.D. The early Punuk ivory-carving art has much in common with the art of the Old Bering Sea people. However, on the whole it is inferior to it by the latter's manifold artistic forms and complexity of execution (Figure 19.1:8, 13; Figure 19.2:2, 8, 12; Figure 19.3:14). Sergei A. Arutiunov and Dorian A. Sergeev explain this by the shift of "the burden of ideological forms of self-expression of a society from graphic means into oral and visual [performing] ones." Such a change in the spiritual culture of sea-mammal hunters of ancient Chukotka was brought about, in the opinion of these researchers, by changes in social life, and particularly the enlargement of early Punuk communities as a result of the development of whale hunting (Arutiunov and Sergeev 2006 [1975]:183).

Early Punuk was the first to leave us indisputable evidence of the presence of fighting weapons among early hunters of Bering Strait. At Ekven, in Burial 14, two protective masks of walrus tusk (goggles-visors) were found, and in Dwelling H-18, armor plates of reindeer antler (Arutiunov and Sergeev 2006 [1975]:125, Figure 51; Bronshtein and Dneprovsky 2001:602, Figure 9:6). Armed conflicts probably took place on the Chukotka coasts in preceding periods as well, though it is not by chance that it was among the early Punuk people that items of fighting equipment were found. They evidently consciously strove toward domination in the early Eskimo society of Chukotka. Thus, the above-noted "dissolution" of OBS III and Birnirk in early Punuk was brought on not just by the higher capability of the early Punuk people to compete in economic terms. Their purposeful activity of subordinating "foreigners" probably became one of the primary reasons leading to the fact that the cultural variation, which existed in the coastal regions of Northeast Asia throughout the first millennium A.D., was replaced by the domination of one cultural tradition.

This Neoeskimo culture of Chukotka remained uniform throughout the next several centuries, whereupon in the twelfth to thirteenth centuries A.D. early Punuk was transformed into the "classic variant" of Thule-Punuk cultural society. The study of the archaeological sites of this subculture located on the Chukchi Peninsula—called in Russian historiography "developed" or "late" Punuk—is at present in the beginning stages. The factual data available to modern researchers permit perhaps saying reliably only that late Punuk people of Chukotka hunted predominantly whales, and the level of their social organization was the highest in all the multicentury history of early Eskimos of Northeast Asia.

The largest sites of late Punuk are the religious-domestic complex of Whale Alley and the settlement of Masik. Whale Alley, discovered in 1976 by Michael A. Chlenov, is a group of large-scale structures of whale bones and stones erected on Yttygran Island near the southeast shore of the Chukchi Peninsula. Its primary components are the skulls and mandibles of 50 to 60 bowhead whales dug into the earth in two parallel rows, cache pits, artificial structures laid out in the form of stone rings and a man-made stone road 50 m long that leads to an area surrounded by boulders with a hearth in the center. According to the hypothesis of the first investigators of Whale Alley, Michael A. Chlenov, Igor I. Krupnik, and Sergei A. Arutiunov (Arutiunov et al. 1982), this architectural complex was the central sanctuary of the Punuk of southeastern Chukotka, who entered into a "secret male union" of whale hunters. The early sea-mammal hunters of Bering Strait

periodically gathered on Yttygran Island “for jointly carrying out esoteric ritual activities, possibly accompanied by potlatch-like ceremonies” (Arutiunov et al. 1982:152).

The construction of Whale Alley, which required great expenditures of time and effort, was done, in the opinion of Chlenov and his colleagues, in the fourteenth century during the period of efflorescence of late Punuk. These researchers consider the sixteenth century the upper chronological boundary of the site, when decline of this cultural tradition set in (Arutiunov et al. 1982:142). Sergei V. Gusev, who investigated the site in 1993 and 2006, came to similar conclusions about the assignment of Whale Alley and its date. Whale Alley, in his words, was an “economic and spiritual complex” that functioned in the fourteenth and fifteenth to the sixteenth and seventeenth centuries (Gusev 2010:495–496).

The settlement of Masik, discovered in 1981 by Chlenov and Krupnik, is located on the eastern shore of Chukotka in Mechigmen Bay, north of Yttygran Island. It also includes large structures of whale bones similar to those preserved at Whale Alley. In addition to similar structures, a large number of semisubterranean dwellings were revealed at Masik. To erect them, the residents of the settlement used the skulls of young gray whales “as the primary structural material” (Arutiunov et al. 1982:163).

Preliminary investigations at Masik allow the identification of structures that belong to different periods in the history of late Punuk—from its initial stage (twelfth to thirteenth centuries) to the final stage (sixteenth to seventeenth centuries). The scale of the settlement and the length of its occupation, as well as the character of the architectural constructions preserved at Masik, give it special value. However, a detailed archaeological study of this site, and incidentally also Whale Alley, has not yet been carried out.

The necessity of such investigations is especially urgent. Whale Alley and the structures at Masik have no direct analogies and for this reason merit the closest attention. The expansion of our knowledge about these cultural-historical objects can shed additional light on the reasons for the crisis in such a powerful Neoeskimo whaling tradition as late Punuk. Its departure from the scene is usually explained by climatic changes during the second half of the second millennium A.D. that led to a reduction in the number of whales in the Arctic Basin. In Chukotka the decline of late Punuk was probably accelerated by another factor: massive resettlement of the Chukchi, who inhabited the continental tundra up to the sixteenth and seventeenth centuries, into the coastal regions occupied by Eskimos. It is not out of the question that there were also other reasons, as a result of which the way of life of the residents of the Chukotka coasts was significantly changed, and in place of the large communities of whale hunters, capable of erecting large-scale architectural complexes, there arrived small, individual societies of sea-mammal hunters oriented chiefly toward procuring seals and walrus.

With the disappearance of late Punuk the early Eskimo epoch in the history of Northeast Asia ended. The central theme of this long period of time, that lasted at least 2,000 years, was, in our view, the intensive search by traditional society for a more effective strategy of survival on the shores of the Arctic seas. Each of the early Eskimo archaeological cultures can probably be viewed as a search for a similar strategy, as a stage on the way toward attaining optimal methods of adaptation to climatic and natural conditions of the polar coasts by the northernmost people of the earth.

Adapting to life in the coastal regions of the Arctic, the early Eskimos of Chukotka, like the majority of early Eskimo tribes of Alaska, Canada, and Greenland, created a cultural tradition based on sea-mammal hunting. This tradition was steadily developed. Sea-mammal hunters of Northeast Asia opened up new territories, and perfected hunting methods. The share of whales—gray and bowhead—gradually increased in their procurement. Hunting them provided people with incomparably larger supplies of food than hunting seals and walruses, but was undoubtedly connected with great risk and required great effort. Evidently for this reason, during the full Neoeskimo period on Chukotka, the bulk of procured whales was made up of yearling gray whales, the hunt for which could be conducted in the immediate vicinity of the shore.

The complexity of adaptation to high latitudes increased owing to fluctuations in the Arctic climate. The variety of the cultural traditions that existed in Chukotka, being distinctly traced in the archaeological materials, was in significant degree a result of periodic changes in the climate and natural environments. It is far from chance that the efflorescence of the Old Bering Sea culture—the spread of OBS II and beginning of formation of OBS III—coincides with the relatively warm period of A.D. 100–700. Probably even an insignificant warming of the Arctic climate, extremely severe for people, contributed to an increase in the population, and this in turn created conditions for more active opening up of new territory and the formation of new forms of material, social, and spiritual culture. Correspondingly, the transformation of OBS III into a Birnirk-Punuk society and its subsequent “dissolution” later, occurred, not by chance alone, but was associated with the cooling at the end of the first and beginning of the second millennium A.D. The Old Bering Sea culture, which developed in less severe climatic conditions, evidently lost its former ability to compete during this period and in the end yielded to cultural traditions that in larger degree conformed to the changed ecological situation.

In turn, in addition, it was probably also not by chance alone, that the Birnirk people, with their barbed harpoons adapted for hunting seals at breathing holes in the ice, having obtained an advantage over the Old Bering Sea people during the period of cooling (A.D. 700–1100), probably yielded to the whale-hunting Punuk people in the twelfth to thirteenth centuries. Concerning this cultural tradition, evidently its emergence during the second half of the first millennium A.D. (early Punuk) was connected in part with the increase in Bering Strait in the number of bowhead whales—pagophylic animals (ice lovers)—which in turn was the result of the cooling that brought the ice fields closer to the shores of Chukotka. It seems logical that the entry of Punuk into the developed stage of late Punuk began in the twelfth to thirteenth centuries, when bowhead whales began to appear still more often at the coasts of Chukotka because of certain climatic fluctuations. Finally, we should note that many researchers consider the primary reason for the decline of Punuk the reduction in the number of whales in the Arctic Basin brought on, like the preceding increase, by climatic shifts.

One of the important factors that contributed to the mosaic and dynamism of the Neoeskimo societies of Chukotka was the need to adapt to specific natural conditions of the occupied territory. This is confirmed in particular by the results of osteological analysis of the faunal materials from different settlements. Thus, in Ekven and Kaniskak (Dezhnevo), located on migration routes, birds accounted for 20–50 percent of the

hunters' quarry, whereas in other places birds did not exceed 3 percent of the take. In such cases, not only did the number of birds obtained shift, but so also did the species represented that depended on the presence of colonies of the particular species of birds.

Along with climatic, natural, and geographic factors, significant influence was exerted on the dynamics of the Neoeskimo cultures of Northeast Asia by sociohistorical factors, including contacts between different local groups—cultural, subcultural, ethnic, and territorial. Data were cited above on the close relationship of the Old Bering Sea, Birnirk, and early Punuk of Chukotka. Comparative analysis of the archaeological finds made on both sides of Bering Strait leaves no doubt that early sea-mammal hunters of the Asian and American Arctic shores also had connections with each other.

We have already noted the obvious similarity of the small figurative art of Okvik discovered at Uelen and on St. Lawrence Island. We will cite several more examples. In Ekven Burial 250 and in Dwelling 69 of the Ipiutak settlement in Alaska, harpoon heads were discovered that are analogous in construction and character of decoration (OBS I). At Ekven in Burial 10–11 and on St. Lawrence Island in the Kukulik site, absolutely identical heads of harpoon shafts (OBS II) were found. Structural features and decoration (OBS III) on harpoon stabilizers from Ekven Burials 9, 12, and 17, and from St. Lawrence Island completely correspond. Snow goggles found at Dwelling H-1 of the Paipelghak settlement and in Alaska at Point Barrow have identical form and practically identical graphic design (Birnirk). Two early Punuk needle cases are almost indistinguishable from each other, one of which was found at Ekven in Burial 252, the other at the Nunagiak site at Point Barrow. The similarity between the above-mentioned wooden sculpture of two mating whales from Ekven Dwelling H-18 and the image of two whales from Point Barrow (early Punuk), also carved of wood, is also obvious (Arutiunov and Sergeev, 2006 [1975]; Bronshtein 2010; Bronshtein et al. 2007; Collins 1937; Fitzhugh et al. 2009; Ford 1959; Larsen and Rainey 1948; Leskov and Müller-Beck 1993; Wardwell 1986).

Based on the functional assignment of identical finds from the Asian and American coasts of Bering Strait, as well as considering their large number (by our calculation, this is hundreds of artifacts), it can be boldly suggested that cultural contacts of the Neoeskimos of Chukotka and Alaska took on different forms—from migrations and exchange of marriage partners to joint hunting and ceremonial activity. During the course of such contacts not only were specifically concrete tasks probably decided, but also important goals were attained, such as the exchange of knowledge and skills necessary for successful adaptation of traditional society to the Arctic. Knowledge and skills obtained by Asian Eskimos from American neighbors stimulated the search activity of the sea-mammal hunters of ancient Chukotka and in the end contributed to the formation of new cultural traditions among them. (Probably the interaction with the residents of the Asian coast of Bering Strait exerted the same fruitful influence on the development of the Neoeskimos of Alaska.)

The mosaic, dynamism, and “openness” of early Eskimo societies of Chukotka, and their ability to have close cross-cultural contacts, can thus be viewed, along with sea-mammal hunting, as an indispensable condition for survival of traditional society on the shores of the Arctic Ocean, and as the result of the search by the early residents of the coastal regions of Northeast Asia for an optimal strategy for maintaining life.

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NOTES

1. All the radiocarbon dates were calibrated with the aid of the program OxCal v. 4.1.7 (Bronk Ramsey 2010). For calibration of the dates obtained on marine organisms, version Marine 09 was used. For Chukotka, in this case, we used the regional correction $\Delta R = 188 \pm 27$ years that we obtained. See Khassanov and Savinetsky (2006). The main number of radiocarbon dates is cited in the monograph of Dinesman et al. (1999).
2. Excavations of the Uelen cemetery were conducted in the 1950s and 1960s by the expedition of Maxim G. Levin, on which Sergei A. Arutiunov and Dorian A. Sergeev worked, and by the expedition of Nikolai N. Dikov. Excavations of the Ekven cemetery were conducted in 1961–1974 by Sergei A. Arutiunov and Dorian A. Sergeev and in 1987–1995 by the expedition of the State Museum of Oriental Art.
3. Also found in Burial 204 was an iron burin, an extremely rare find for early Eskimo cultures of the first millennium A.D. (Arutiunov and Sergeev 1983:210).
4. The authors of the present article do not share the widespread point of view that Okvik and OBS I are the same cultural tradition. We view Okvik as an independent culture, differing from early Old Bering Sea (OBS I) by such significant features as the form of the harpoon heads and graphic design.
5. The assignment of this site to OBS II is supported by discoveries there of decorated artifacts of walrus tusk. See Figure 19.3:2–4, 6–8, 11, 13, 15–16.
6. Harpoon heads found in this dwelling have classic Birnirk forms. See Dneprovsky (2006:48–49, Figure 8).
7. Among the harpoons found in H-18, Birnirk and early Punuk artifacts were represented in equal proportions. See Bronshtein and Dneprovsky (2001:594–595, Figures 1–2).

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CHAPTER 20

THULE ORIGINS IN THE OLD BERING SEA CULTURE

The Interrelationship of Punuk and Birnirk Cultures

OWEN K. MASON

THE Thule culture was configured from its eastern margin, tagged by a toponym from Hellenistic geography by Mathiassen (1927:184), who working in northern Canada, inferred a Bering Strait origin in view of distinctive barbed harpoon heads. Thule is foremost an “arctic whale hunting culture,” the last incarnation of a “Northern maritime tradition” (Collins 1964:90–101) and, importantly, the predecessor of modern Iñupiat and Inuit. The considerable and renowned Thule whaling prowess lends their origin a political cast in modern communities. Mitigating extrinsic factors are Thule’s intersection with the collapse of the Old Bering Sea/Ipiutak *oikoumene* in the tenth century A.D. (Mason 2006, 2009a) and the role of Punuk as a precursor. Early researchers regarded both Punuk and Thule as a “slow and gradual” devolution” (Jenness 1941:391) from “highly developed” Old Bering Sea culture (Collins 1937:383).

Most archaeologists accept Collins’s (1937:365–366) dictum for an origin within Old Bering Sea, with a corollary: “The Thule culture is the offspring of the Birnirk,” as stated by De Laguna (1947:8), pushing its origin into a “postulated Birnirk to Thule sequence” (Collins 1964:99) or “transition” (Morrison 2001) intriguing archaeologists for 75 years. A contrary view is that of Larsen and Rainey (1948:184) who postulated that “Birnirk . . . may have developed out of the Ipiutak culture through influence from the Bering Strait region.” To infer Thule origins, Mathiassen (1927:182) proposed five preconditions: (1) as a “typical arctic culture,” it “los[es] its stamp and disappears to the south”; (2) the presence of sea ice is crucial; (3) “particularly adapted to the hunting of whales”; (4) of necessity coastal; and (5) requiring an “abundance of wood” for skin boat and “cone-shaped” tent frames. All the preconditions were satisfied in the Siberian or Alaskan Chukchi Sea coasts, concluded Mathiassen (1927:184).

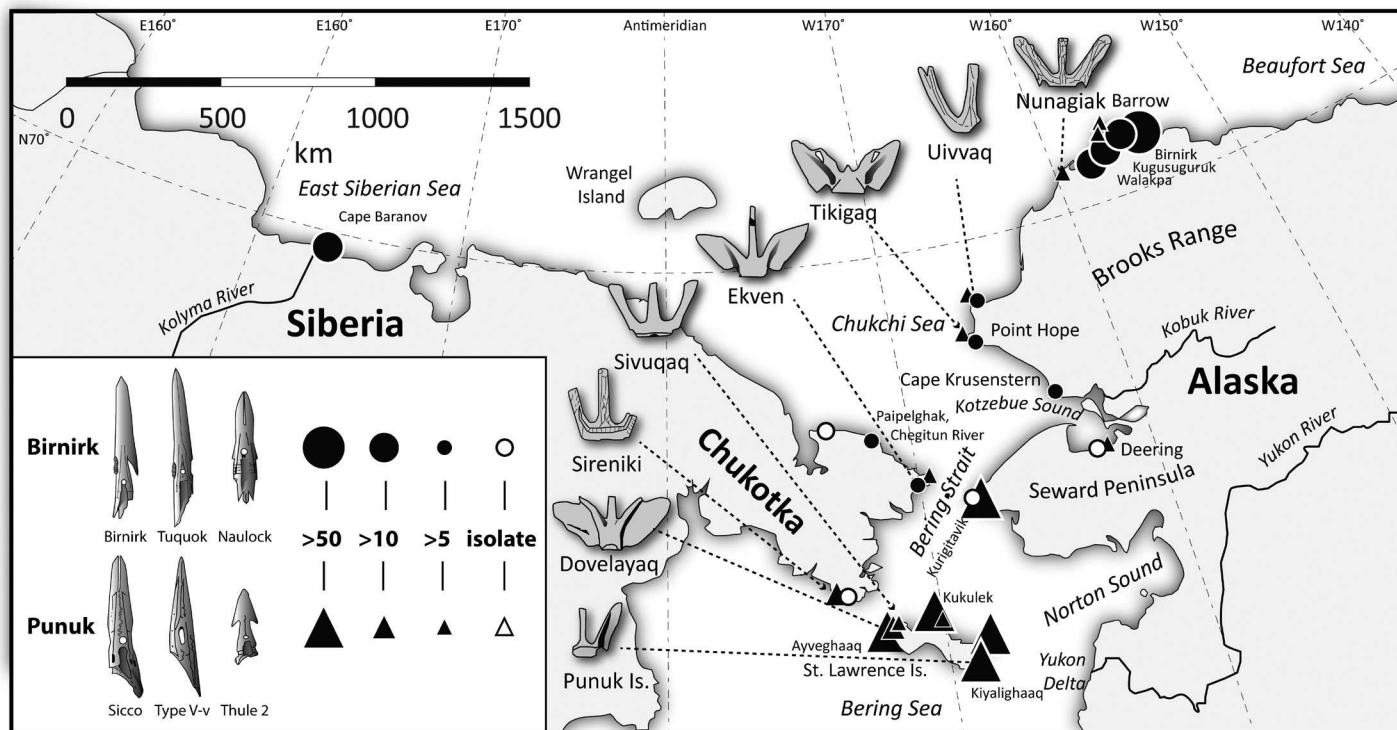


FIGURE 20.1 Distribution of Birnirk and Punuk sites in Bering Sea, noting a reciprocal pattern. Punuk sites occur generally in the southern regions around St. Lawrence Island, whereas Birnirk is distributed along the coasts of the Chukchi Sea, and is especially prominent around Barrow. The distribution of Punuk sites along the Alaska coast appears to be a single migration event. Inset are Birnirk, Natchuk, Sicco, and Thule 2 harpoon heads, common during the Birnirk-Thule transition. After Mason (2009b). Illustrated are Punuk atlatl counterweights (“winged objects”) that record a migration from Bering Strait northward. Note that four varieties occur at widely separated sites. Images are from: Sireniki (Rudenko 1961:97, Plate 29:24), Ekven (Bronstein et al. 1997:21), Ayveghaaq (Collins 1937:Plates 68–69), Point Hope (Mathiassen 1929:45), Uivvaq (Hoffecker et al. 2012:Fig. 10), Nunagiak (Ford 1959:61ff), and Dovelayaq (Hofman-Wyss 1987:Table 4).

Illustration by John Darwent

The search for Thule origins was similarly cast toward Siberia by Collins (1940:435), based on its predominant Asian *techné*. However, Collins, over 40 years, proposed alternative regions as Thule hearths, from Chukotka to the Beaufort Sea (Collins 1935:466, 1940:562). As his efforts on St. Lawrence Island yielded no firm evidence of Thule, Collins (1929:47) proposed that northern Chukotka was “the most likely” locale to trace Birnirk origins, exemplified by harpoon heads at Cape Baranov (Mathiassen 1927:180), where, by the 1940s, Okladnikov and Beregovaya (2008 [1971]) had documented a Birnirk occupation with an OBS component. Nonetheless, even in 1960, Collins (1960:133) wavered: “it was too early to [say] definitively [whether] . . . the Birnirk culture originated in Siberia or Alaska.”

Thule origins are usually embedded in several theoretical perspectives, with extrinsic or intrinsic forcings: (1) adverse climate—typically warmer (McGhee 1969–1970); (2) population and ecological stress (Bockstoce 1973); and (3) familial inequality and agency: the aggrandizing family or *umalik*, as opposed to the younger or less affluent (Whitridge 1999). A linkage to adversely warm climate offers contemporary relevance in a globally changed world (McGhee 1969–1970), and is extended into an ecological cause—local depletion of ringed seal—by Stanford (1976). Such deterministic perspectives are critiqued as simplistic extrapolations of climate data (cf. Mason and Barber 2003) that imports the Medieval Warm Period (i.e., the Medieval Climate Anomaly) into Alaska from northwest Europe (cf. Hughes and Diaz 1994).

PUNUK: CONTINUITY OR DISJUNCTURE WITH OLD BERING SEA?

To examine the origin of Birnirk, one must consider its relationship with Punuk (Figure 20.1), the dominant culture after Old Bering Sea (OBS) on St. Lawrence Island (Collins 1937:363–364; 1964:94–100). Neither *true* Birnirk or Thule (despite a few type 2 heads) occur south of Bering Strait; Geist and Rainey’s (1937) “Birnirk” and “Thule” are more properly Early Punuk and Late Punuk (Collins 1964:99). To Collins (1964:99), at Kurigitavik the commonalities were so intertwined as to define a blended Thule-Punuk culture, a distinction implicitly accepted by many Russians (Rudenko 1961 [1947]).

Punuk culture is defined by a distinctive spare and curvilinear style (Collins 1961:13). While Punuk is ubiquitous along southern Chukotka coasts (Rudenko 1961 [1947]; Dikov 2004 [1979]), only a few mainland north Alaska locales betray a Punuk presence: most famously, Kurigitavik mound near Wales (Dumond 2000; Harritt 2004), Uivaaq at Cape Lisburne (Mason et al. 2003), Nunagiak (Ford 1959:67), and, based on the Sicco harpoon head, the Birnirk mounds (Ford 1959:86) and Nuvuk Burial 1 (Jensen 2007). Nearly every OBS mound on St. Lawrence Island is overlain by Punuk materials (Crowell 1984), bolstering Collins’s (1937:379) supposition of an *in situ* transformation of

OBS to Punuk. Stylistic similitude, greater abstraction, served as the basis for the initial derivation of Punuk from OBS (Collins 1937:92–93); all the product of the hypothesized adoption of metal tools, and a shift to “rubbed” (i.e., ground) slate. Ackerman (1961, 1962, 1984:109–113) treated it as a composite merged with Birnirk. The taxonomic complexities of the Punuk and Thule cultures, reviewed by Mason (2009a:87–99, 2009b:86), indicate that the circumstances of archaeological discovery still bias interpretation.

The origins of the Punuk culture remain obscure, rooted in past historiography: Collins (1937:96–97) conceived OBS shifting to Punuk over a “quite gradual” transition on St. Lawrence Island (Collins 1964:94), but a direct influence from Asia was also postulated by Collins (1964:13). In this prism, Punuk originated within an unique historical moment, the ninth century A.D., traceable to accelerating interaction with outsiders in Chukotka possessed of superior iron and military technology during the seventh and eighth centuries A.D. (Collins 1937:332; Whitridge 1999:126). Alternatively, the duration of the translation of OBS to Punuk was decades to centuries, a “gradual” process, with intervening transitional styles (Rudenko 1961 [1947]:161); possibly its duration extended from A.D. 700 to 1100, as inferred from dated Sivuqaq burials (Staley and Mason 2004).

TECHNOLOGY: WAR AND SUBSISTENCE

Several traits in harpoon heads and winged objects (Collins 1964:94–97) provide a strong argument for continuity between OBS and Punuk. Nonetheless, some technological shifts were unparalleled in OBS culture: the purported Punuk innovations include military and archery; most were derived from Siberia (e.g., slat armor, cf. Rudenko 1961 [1947]:152) or, ultimately, Manchuria (Collins 1937:325–333; reviewed in Mason 2009b, 2012). The adoption of improved archery was of crucial importance, accompanied by other military devices (i.e., slat armor), the use of the compound bow, wrist guards, and the more northern “Birnirk” atlatl. Punuk militarism was far from revolutionary, considering the equivocal evidence (Mason 2009b), compared to the violence in Ipiutak (Mason 2006) or during the Later Western Thule, between AD 1550 to 1700 (Mason 2012). One Punuk object represents an OBS derivation (Mason, this volume, chapter 17), the distinctive streamlined “trident” type of atlatl counterweight, with engraved curvilinear motifs (Collins 1964:96–97). The trident has four regional variants that occur at widely separated locales (Figure 20.1); for example, the Uivvaq (Cape Lisburne) trident, dated within the eleventh century, resembles both the Sirenki and Sivuqaq types (Hoffecker et al. 2012) and is arguably part of the leading edge of a northward migration (Mason 2009b:95). The other tridents are undated but imply linkages between Cape Dezhneva, Point Hope, and Nunagiak by common trident types. Composite bows and fish hooks also “appear” suddenly; might one type of composite tool have led to changes in another technology? Changes in subsistence priorities or techniques are evident in the use of the bola for birding, as well as in the design of prongs and blunt arrow points for bird hunting. The Punuk culture, to Collins (1937:217), was the first truly sophisticated whaling culture

on St. Lawrence Island, but with less success than later cultures: “it is only in relatively recent times that whaling has become an important occupation with the St. Lawrence Island Eskimos.” Whaling harpoon heads occur in slightly higher percentages, although the sample remains low (Collins 1937:217). The replacement of chipped stone by ground stone may reflect whaling requisites, a shift in trade relationships, or lithic sources.

Punuk witnessed significant shifts in architecture, social space, and the elaboration of leisure activities. Enhanced specialized structures, described below, are accompanied by the “more prominent place” of the drum (Collins 1937:239), a reflection of social process and its architectural requisites. Several Punuk “leisure” or decorative objects were “considerably more common,” including toys, combs, and a “wide variety” of pendants of ivory, and dog and polar bear canines (Collins 1937:242–243). Other Punuk items of adornment include brow bands, buttons, and earrings embedded with pyrites, the last resembling Nunivak Island practice (Collins 1937:243, Plate 82:16). Links of ivory, employed on ulu and other handles, were a novelty in the presumed latter phase of Punuk (Collins 1937:241), with resemblances to Ipiutak open-work carvings (Larsen and Rainey 1948; Mason, this volume, chapter 18). Increases in fashion, leisure, or social display could correlate with the added surplus from more successful whaling, although one might expect social displays to increase in grave goods, which it does not.

ARCHITECTURE AND OCCUPATION CHRONOLOGY

Punuk people expanded their architectural requisites considerably, constructing larger houses and adding specialized large spaces apparently for theatrical or communal living arrangements. Only a handful of structures or spaces are archaeologically documented; all are either driftwood-walled, rock-floored or bone alignments with lengthy but narrow entryways (Collins 1937:69–76, 183–186). The universe of excavated Punuk houses is fairly circumscribed ($n = 7$). Collins (1937:183–186) revealed two stone-walled, stone-floored houses from Ayveghaaq, in a “pure[ly] Punuk” occupation; neither house is dated. Single-roomed House 6 enclosed 34 m², sufficient for 15 people, entered through a 2.6 m entry. House 7, a stone-floored structure, was supported by whale-bone uprights in each corner and had two crushed skeletons (Collins 1937:185–186). Neither house had many artifacts, although House 7 had potsherds, a kayak paddle, drum handle, bird snares, and a fire-making board. At Kitnepaluk, two stone houses were excavated in 1939 by Giddings (1957:133), and may be Punuk, although the collection remains unanalyzed. Two Punuk structures were further revealed at Kitnepaluk by Bandi in the 1970s (Bandi and Bürgi 1972; Blumer 1997). Houses 1 and 2 establish two successive occupations, the first between A.D. 825 and 1000 and the second between A.D. 1020 and 1190 (Blumer 2002:82). The assemblages establish the range of Punuk domestic activities, and include decorated harpoon heads (Blumer 1997). Occupied between A.D. 1255 and 1400, Mayughaaq Punuk

House 2 (Bandi and Bürgi 1972:91) was a multiroomed stone structure with side cache pits (Blumer 2002:73) and also incorporated a bowhead skull into its entry (Bandi and Bürgi 1972:93)—similar to House 1 at Jabbertown, excavated by Larsen (Mason and Bowers 2009). The Mayughaaq House 2 inventory included Sicco harpoon heads (Bandi and Bürgi 1972:Figures 41, 42), supplemented by bolas, float nozzles, bird blunts, and a diverse chipped and ground slate technology. The fauna from House 2 were preeminently walrus and bowhead, supplemented by various seal species (Bandi and Bürgi 1972:110–111).

Three large and architecturally sophisticated spaces may have community or spiritual significance. At Sirenki on the Chukotsk Peninsula (Rudenko 1961 [1947]:71, 113), two whale-bone structures, entered through a 14 m passage, enclosed 200 m² in area and incorporated more than 150 beluga skulls. The Sirenki edifice dwarfs any other known Punuk structure—but is not termed a qargi. A much smaller space, ca. 40 m², was constructed of similar materials on St. Lawrence Island, east of Mayughaaq. With its 8 m long entry, House G I had several floor areas partially covered by rock slabs, with entryway walls of horizontal logs, and bowhead whale skulls. Only a few lithic and ceramics objects were recovered from the space; none were diagnostic but “structure G I . . . provide[s] the first indication [of] communal men’s houses” (Bandi and Blumer 2002:48). A similar space, outlined by boulders, was recorded on the crest of King Island, with charcoal dated to the ninth century A.D. (Mason 2009a:95).

MORTUARY REMAINS, WARFARE, AND THE FATE OF PUNUK

Punuk burials are far less numerous and are less well appointed than those of OBS or Ipiutak cultures. On St. Lawrence Island, Punuk people used the same cemeteries as earlier Mayughaaq villagers, an argument for cultural continuity—however, only four Sivuqaq burials contained any Punuk artifacts (Staley and Mason 2004). A single grave, dated A.D. 700–900, had over two dozen grave offerings (Staley and Mason 2004). Around Cape Dezhneva, Punuk comprises but a small percentage of burials ($n = 16$), 8 percent, similar to the number of nonlocal Ipiutak interments (Bronshstein and Plumet 1995:33–34)—were they enemies or partners in trade or marriage? Only one Punuk burial occurs on the entire Alaska mainland, Nuvuk Burial 1, with its few but impressive offerings (Jensen 2007). Very likely, Nuvuk witnessed many more Punuk interments, in view of the circumstance that many graves are framed by whale mandibles, and status accoutrements are generally lacking and the single, well-appointed Nuvuk interment may reflect social differentiation.

The lengthy biographies of Bering Strait objects and styles (Blumer 2002:92) imply the cultures of the region do not definitely end or fade away, Ipiutak being the exception (Mason, this volume, chapter 18). The Mayughaaq house may be evidence of the persistence of Punuk into the thirteenth century, even the fourteenth century A.D., contemporaneous

with several Birnirk occupations within Kotzebue Sound (Mason and Bowers 2009, and below) and the terminal OBS occupation in the Cape Dezhneva area (Mason, this volume, chapter 18). The interrelationships of Punuk and Birnirk, so forcefully argued by Ford (1959:241), Collins (1937:364-366), and Ackerman (1962), reflect either population density or information transfers in Bering Strait. The mélange of Punuk and Birnirk traits within a few, mostly southern sites (Ekven, S'keliyuk) may be evidence of cultural interaction.

That not all relationships were peaceful is evidenced that several bodies lie atop the eleventh-century A.D. Ekven house, associated with slat armor (Dneprovsky 2002:170). This may reflect an attack by Punuk people across Anadyr Strait from St. Lawrence Island. Similarly, the chest cavity within Grave II at Mayughaaq was peppered with a dozen Punuk bone points—propelled by Siberian Punuk enemies (Bandi 1995:168). Clearly, Punuk had war-like propensities but the current evidence is against a militarization similar to Ipiutak (Mason 2009b).

One clue to the fate of Punuk people is a south-to-north trend of atlatl counterweights (Figure 20.2) that falls during the eleventh century A.D., across northern Alaska. Ford (1959:67) argued for a migration, even just of one family, from St. Lawrence Island, consisting of a slow and persistent dribble, if not a definite colonization (Mason 2009b). Any such Punuk migrants must have encountered sporadic Birnirk villagers who were met either as enemies or as allies—the Birnirk House 18 at Ekven possibly housed recent migrants (Dneprovsky 2002:171).

Defining Birnirk: Settlement and Cemetery Distribution

Exclusive of the pan-North American Arctic Thule culture, Birnirk is one of the most widespread cultural phenomena in the Arctic (Figure 20.1), ranging over 2500 km from Cape Baranov near the Kolyma River to the central Canadian Arctic, based on isolated finds of its harpoon heads (Taylor 1963). Its origin is still as occluded as when De Laguna (1947:8) proposed genealogically: “The Birnirk is either the grandchild of Old Bering Sea by an unknown parent, according to Collins; the brother of Old Bering Sea by an unknown parent, according to Jenness; or the half-brother or nephew of Old Bering Sea, according to my guess.” Birnirk is a “poorly defined” (Giddings 1960:124) chameleon: “What is this Birnirk, anyway?” J. Louis Giddings reportedly muttered in 1964 (Carter 1966:28). Few sites are definitively “pure” Birnirk assemblages, containing multiple house ruins or burials; all cluster on the northern Alaska littoral (Ford 1959) or the northern Chukchi Peninsula shore (Dikov 2004 [1979]). The Birnirk culture is distinguished by its architectural residua, superimposed houses that produced mounds, and in its mortuary treatments, of which are preserved a substantial number, over 120, mostly at one site, the purported charnel houses at Kugusuguruk (Ford 1959:19; Mason 1930). For whatever reason, many Birnirk burials occur within houses or, possibly, in specialized structures (Ford 1959:19). The individual Birnirk house mound is unique for the western Arctic, although larger multihouse mounds occur in Old Bering Sea (Mason, this volume, chapter 17). Birnirk house mounds vary in diameter, from 5 to

20 m, but mostly attain the same elevation, ca. 3 m, and represent successive rebuilding events. Likely, each mound represents the domestic precinct of a single family, a presence that served as a mnemonic device and evidence of continuity. The relative demographic importance of Birnirk sites can be appreciated from frequency plots of Birnirk harpoon heads (Mason and Bowers 2009): Northern Alaska has the highest number, mostly in the Wainwright to Point Barrow region, followed closely by Cape Baranov, over 1,800 km distant, on the shores of the East Siberian Sea, near the Kolyma River mouth. A cluster of Birnirk sites occur along the north Chukotsk Peninsula, including Nesh'kan on a barrier island, Paipelghak (Dneprovsky 2006) on a rocky headland, and Chegitun (Dikov 2003 [1977]:170) at the mouth of a small river.

Since its initiation over a century ago, the archaeology of Birnirk has involved subsistence diggers, and avocational and, occasionally, trained archaeologists. Unfortunately, the best sites were discovered early and were compromised due to inexperience and flawed technique. The Barrow region witnessed the early efforts of avocational diggers: At Kugusuguruk, Birnirk burial mounds, one of the most richly appointed in the western Arctic, were discovered and exhumed by the Barrow teacher W. B. Van Valin (1941) in 1917. Sponsored by the Smithsonian in the 1930s, James Ford reconnoitered the northern Alaska coast from Point Belcher (Nunagiak) to Point Barrow (Ford 1959:13-16), locating and testing most of the known Birnirk sites, with purchased materials forming an important adjunct to excavations that were conducted largely by Native people.

Piqniq, or "Birnirk," 4 km north of Barrow, includes 20 house mounds on a plain landward of Little Ice Age storm ridges; the mounds were up to 3 m in height and 15 m in diameter. Birnirk first witnessed contracted digging in 1909 (Stefánsson 1913:388) followed by archaeological excavations in the mid-1930s (Ford 1959) and in the early 1950s by Carter (1966), whose larger and more systematic efforts remain unanalyzed. At least a third of the site remains unexcavated. Considering the hugeness of its collections, reports on the Birnirk site are sparse and incomplete, especially for the earliest efforts of Stefánsson (1913; Mason 1930; Wissler 1919). Owing to a bias from limited publication, Ford's (1959) inference of a "pure" Birnirk occupation prevails in the literature, and contrasts with the significant role for OBS proposed by Carter (1966:25), in a lengthy unpublished report.

To the south, the presence of Birnirk is variable. Only a small Birnirk assemblage (atlatl, Birnirk head) underlies the Thule mounds at Utqiagvik (Simpson 1995) with a small cemetery in the Kugok ravine (Ford 1959:31; Hall and Fullerton 1990). Farther south, about 18 km and 1 km inland, along a small draw, the six Kugusuguruk mounds contained more than 80 bodies (Ford 1959:19, 30; Mason 1930; van Valin 1941:23). Walakpa bluff, 20 km south of Barrow, contained the residua of two Birnirk structures, one summer, one winter; both were excavated by Stanford (1976:10, 91-92). Nunagiak, at Point Belcher, contained thirteen 3 m high mounds between 15 and 40 m in width (Ford 1959:56). Near Point Hope, only two burials, but no houses, occur on the spit, while Jabbertown (Qimiarzuq), 7 km distant, had two enigmatic houses: House 1, with a whale-skull wall and stone floor, and House 2, a complex multiroomed structure (Larsen and Rainey 1948:171). Cape Krusenstern had only three small Birnirk houses, with an assemblage amalgamating Birnirk and Ipiutak (Giddings and Anderson

1986:Figure 65g). At Cape Espenberg, a small site of more than a dozen houses has yielded two houses to excavation: one possibly multiroom structure dated to the eleventh century A.D. and a second dated to the mid-thirteenth century A.D. The Espenberg houses revealed Birnirk assemblages, with Okvik, Natchuk, Tuquok, or Sicco harpoon heads, marked by affinities to Cape Baranov, St. Lawrence Island, Cape Dezhneva, and the Birnirk site. The younger house includes a wood pin and a burial within the rear room (Hoffecker and Mason 2010). South of Bering Strait, several sites (e.g., Wales) have isolated either Natchuk or Oopik harpoon heads. Safety Sound lacks diagnostic artifacts, and is defined as Birnirk only by the presence of oil (Mason 2000). No definitively Birnirk pieces occur at S'keliyuk (Ackerman 1961), Kukulik (Geist and Rainey 1936), or Uelen (Arutiunov and Sergeev 2006 [1969]).

The Birnirk presence along the southwest Chukchi Sea coast is evident in burials and settlements across Chukotka. The Neshkan barrier island has numerous mounds, one with a substantial Birnirk collection. The headland site of Paipelghak offers six 1.6 m high mounds that document a thirteenth-century Birnirk occupation, replete with numerous Natchuk harpoon heads, slate ulus, and elaborate snow goggles (Dneprovsky 2006:34–35). About 25 km the east, the Chegitun drainage has a Birnirk cemetery precinct, possibly with 50 graves, and several house mounds on the coast (Dikov 2003 [1977]:170–172). Natchuk harpoon heads occur in the second Chegitun cemetery (Dikov 1979 [2003]:172 Plates 162, 163). Finally, at Ekven, a large structure (House 18) has a “mixed Birnirk and Punuk assemblage and only 16 graves are attributed solely to Birnirk” (Bronshstein and Dneprovsky 2002:153–155; Dneprovsky 2002). The cultural importance of Cape Dezhneva was considerable and served as the keeper of the flame for an Old Bering Sea cosmology as late as the fifteenth century A.D. (Mason 2009a; this volume, chapter 17). If OBS persisted so long at Cape Dezhneva, quite possibly the region witnessed an OBS-to-Birnirk transition. Evidence from Sirenki is restricted to the 1940s excavations by Rudenko (1961 [1947]:71); a 4 m deep midden contained Birnirk harpoon heads at its base and was capped by Punuk (Sicco) and Thule (Type 2) harpoon heads. The origins of Birnirk at Sirenki may be traceable to the nearby OBS component.

Birnirk Technology: Continuity, Innovation and Change

Exclusive of the various stylized harpoon heads, discussed above, Birnirk peoples used a variety of objects that distinguish its culture from its neighbors (Figure 20.2), although in technology, Birnirk closely resembles OBS and Punuk (Carter 1966:25; Ford 1959:238–242). Whether an actual OBS occupation preceded Birnirk around Barrow is uncertain. Ford (1959:240) counted 27 OBS and 32 Okvik traits in Birnirk, nearly two-thirds of the total, exclusive of traits in common with early Punuk. Many elements of material culture are doubtless ancient (e.g., kayak or snow goggles), so that the similarities in design motifs, harpoon, or dart types may be more significant (Ford 1959:240). Some elements show both continuity and change, for example the use of chipped stone (Figure 20.2) and the adoption of ground stone. While Birnirk decorative abilities are often disparaged as “simple,”

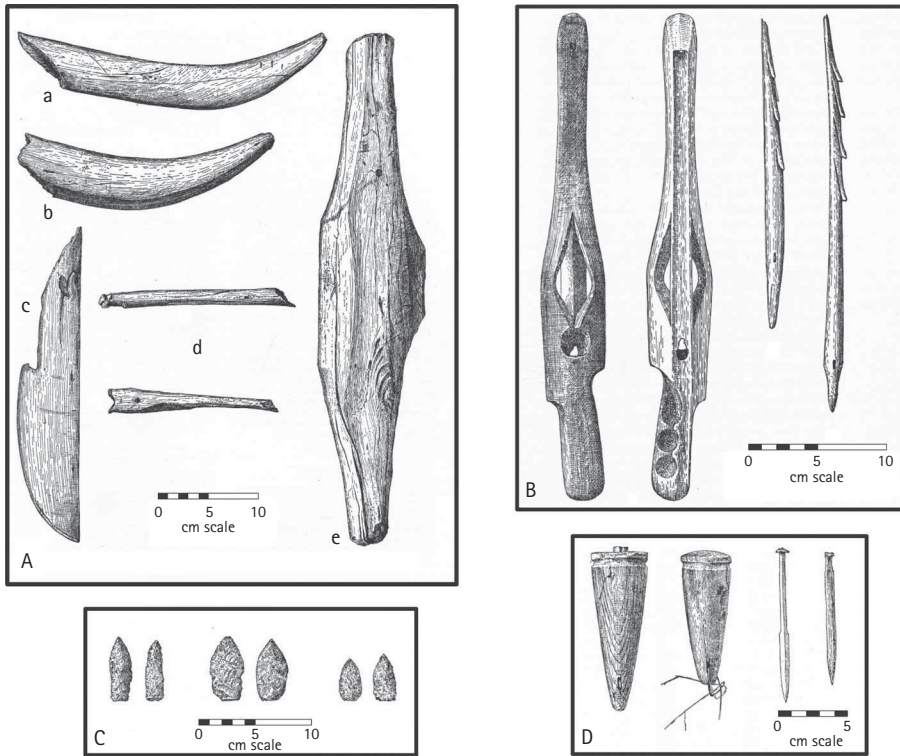


FIGURE 20.2 Material culture at the Birnirk site, illustrating innovative technologies (Ford 1959). (A) (a, b) bow pieces for kayak; (c) paddle for kayak; (d, e) possible kayak rake and rib; (f) wooden cross piece for umiaq frame (Ford 1959:159, Figure 79); (B) left: atlatl; right: bird dart points (Ford 1959:115, Figure 50); (C) flint endblades with resemblances to Ipiutak (Ford 1959:135, Figure 64); (D) left: wound plugs; right: wound pins, employed to staunch wounds in captured seals (Ford 1959:106, Figure 41).

Image compiled by Owen Mason

iron engraving tools were used (Ford 1959:171) to decorate ivory. Ivory bola weights were elaborated in the Barrow region with Ford (1959:138-142) recognizing 12 types, several specific either to Utqiagvik or Birnirk, and the bola was used at Punuk sites near Bering Strait (Ford 1959:141). While slate was employed for a variety of crucial objects, such as ulus and endblades, Birnirk people were seemingly more interested in chipping high-quality chert, relative to their Punuk contemporaries (Carter 1966). Birnirk's finely flaked lithic technology differs so much from OBS that Larsen and Rainey (1948:184), followed by Anderson (1986:110), argued for an Ipiutak heritage or contribution. Several critical objects or practices, however, are lacking from the Birnirk repertoire, notably, slat armor and labrets. The armor in the Ekven Birnirk House 18 (cf. Mason 2009a:112) seems an exception—or evidence for the killing of Punuk intruders who wore the armor. The once frozen depths of the Birnirk site, quite importantly, preserved the first evidence of skin clothing, including footgear, fur pants, and gut raingear (Ford 1959:218-221).

Most Birnirk sealing equipment closely resembles that of OBS and Punuk, with the use of atlatl but not the counterweight, with toggling harpoon heads and the seal-skin float, employing ivory or wooden nozzles. One Birnirk hunting practice, the wound pin, is idiosyncratic—not part of the Bering Straits repertoire (Ford 1959:106)—and possibly was diagnostic of the culture, similar in use to a wooden wound plug that served to staunch the bleeding of a dispatched seal. Wound pins occur at Birnirk, Nunagiak (Ford 1959:106), Walakpa (Stanford 1976:27), Point Hope (Mathiassen 1930), and Cape Espenberg (Hoffecker and Mason 2010). Baleen served for baskets, ice scoops, and in the netting of ice staff rings, similar to ski poles, a fairly unique Birnirk device (Ford 1959:145). Additional snow equipment included goggles, of both wood and ivory (Ford 1959:146).

Ceramics and wood continued as an important item for culinary efforts and as lamps and containers, as well as a host of other products. Although no single decorative motif is useful in characterizing Birnirk ceramics, despite some predilection for overlapping curvilinear designs applied by ivory paddle stamps (Oswald 1955). However, no specialized ceramic production facilities are yet documented. Wood was as a vital component both for fuel in ceramic firing and in many devices from ladles, dishes, and boats to bows, as in OBS and Punuk. Bowls of wood were also used, well documented at Ekven (Dneprovsky 2002:206). Wood shaping required specialized lithic tools, with wood handled adzes. Wood was perhaps locally abundant, considering its use in snow shovels (Ford 1959:144) that often used scapulae for blades. The bow and arrow are known from preserved fragments of both, with tapering tang antler and ivory arrowheads numerous within the Birnirk mounds, employed for bear, birds, and caribou (Ford 1959:123; Murdoch 1892:201). The arrow points “bear a striking similarity to Old Bering Sea and Okvik from St. Lawrence Island” (Ford 1959:135).

Birnirk reveals an interest in gaming, employing seal vertebrae, and in toys of miniature boats, in artifacts, and in small wooden human figures, some likely with prophylactic intent, charms for crisis events (Ford 1959:224, 226–229). Not renowned for their decorative impulses, some objects are instructive: for example, one miniature depicts an OBS winged object (Ford 1959:Figure 104e). Amulets occur at several places at Paipelghak (Bronshtein et al. 2007) and near Barrow (Jordan 1980), consisting of chipped stone or baleen, shaped like bowheads, bears, or other animals (Jordan 1980).

Birnirk innovation in transportation technology was possibly revolutionary, including the widespread use of the umiaq and dog traction. Nautical craft included kayaks and umiaqs, evident from preserved wood fragments at a variety of sites. Structural frames and models for umiaqs and kayaks occur at Ekven (Dneprovsky 2002:202), Birnirk (Ford 1959:157–159), and Walakpa (Stanford 1976), as well as at Cape Krusenstern (Giddings and Anderson 1986:Plate 60g, h). Base and stern parts from several umiaqs at the Birnirk site, dated ca. A.D. 1015 (Anichenko 2013:25), were excavated by Carter (1966), and a contemporaneous eleventh-century A.D. umiaq was uncovered at Cape Espenberg in 2011. The use of the umiaq supports the claims of larger crew size and long-distance travel. Although dog traction is not definitively accepted for Birnirk (Ford 1959:156), several objects argue in its favor: built-up sled elements, sled shoes at Walakpa (Stanford 1976:44), two purported dog-whip handles on the floors of Birnirk

Mounds A and J (Ford 1959:152, 156), and several swivels possibly used in dog-handling at Walakpa (Stanford 1976:44).

SUBSISTENCE: THE QUESTION OF WHALING

The frequency of whale bones at the Birnirk site, albeit primarily as architectural insets, serve as *prima facie* evidence of bowhead whaling (McCartney 1995). Several dozen bowhead bones occur within Birnirk. Although not tabulated by Ford (1959), Carter (1954:4) counted 721 whale bones just from Mound Q, with another 41 at Walakpa (Stanford 1976:71), not a whaling locale at present. Fauna were recovered within Houses 32 and 33 at Cape Krusenstern, but only briefly described, since “seal bones outnumbered caribou by 20%,” along with the “presence of some ugruk bones” (Giddings and Anderson 1986:98). Measurements from surface bone at Birnirk by McCartney and Savelle (1995) documented whales of 7–11 m in length and substantiated their supposition of whaling. Nonetheless, few artifacts can be firmly associated with whaling; a single harpoon head was recovered at Birnirk (Ford 1959:Figure 40h) while two bifacial lance heads, more than 10 cm in length (Ford 1959:101, 104), resemble the flaked spear heads employed by nineteenth-century Iñupiat whalers at Barrow (cf. Murdoch 1892:241). Very few Birnirk archaeofaunas have undergone rigorous analyses; the efforts of Stanford (1976) remain the most authoritative, but his conclusions are controversial. In Stanford’s (1976) view, the subsistence base at Walakpa shows a near exclusive reliance on ringed seal, and the occurrence of bowhead betokens customary regional trade, not whaling. Continuing, Stanford (1976:81) interprets a decrease in ringed seal size from Birnirk to Early Thule as reflecting adverse, warming (reduced ice) ecological conditions. Finally, the high number of seals, ca. 160 individuals, presumably from a single occupation—of unestablished size or duration—represents a total local depletion of the seal population. This problematic reading of the data, especially in their chronological precision, led Stanford (1976:115) to conclude that the seals were driven to near extinction, which forced the Walakpans to move in order to find more seals; a process that led to the colonization of northern Canada.

ARCHITECTURE

Owing to an inherent randomness in Birnirk mound stratigraphy (“very complex and ‘choppy,’ with evidences of disturbances” [Carter 1966:27]), archaeologists remain mystified about the range of architecture constructed by Birnirk people, although Mound Q contained a single six-room house, joined by passageways with split-log floors (Carter 1954:3). Ford (1959) had discovered that only the last house occupied offered pristine opportunities, and owing to the original sequence of rebuilding, large mounds often contained small remnants of earlier structures. Mound A at Birnirk revealed two possible

meat caches (Structures B and C [Ford 1959]), as well as a meat cellar (Structure H [Ford 1959:47]). Caches or cellars were elaborate constructions, with wood flooring and horizontal walls, and contained fauna as well as diagnostic artifacts such as harpoon heads, bolas, and even sled runners. Burial precincts placed within houses or specialized structures occur with some regularity at Birnirk, although contextual data are too few to establish that the burials were placed within or atop houses, or within specialized constructions, termed “charnel houses” by Mason (1930), from the Kugusuguruk mounds (Ford 1959:19–21). Five burials at Birnirk, within Feature E in Mound A, are concentrated rather enigmatically and seemingly ignominiously within the corner of a “tangle of timbers, whale bones and posts” (Ford 1959:45).

Although too few data are available to trace Birnirk architectural history, some argue that earlier houses were complex, larger, multiroomed, and connected by passageways, as at Jabbertown (Larsen and Rainey 1948:171) and the purportedly “early” Birnirk Mound Q (Carter 1954:4). However, two ^{14}C ages from Jabbertown fall after A.D. 1000, at the younger end of the Birnirk site (Mason and Bowers 2009). Birnirk houses in Alaska were typically small (6–11 m², comprising a single room with an entry and a kitchen area off to the side [Giddings and Anderson 1986:93–94]). Insulating sod blocks were apparently laid over the driftwood frame. Structure A in Mound A at Birnirk presents a number of unique features: its horizontally laid walls combined bowhead mandibles and driftwood with an entry floored by bowhead scapulae (Ford 1959:40). More typically, houses were constructed of driftwood, with plank flooring and horizontal log walls, held in place by corner posts. Intact houses were often associated with small and discrete mounds at Birnirk (C, J, and R; cf. Ford 1959).

Nearly two dozen Birnirk structures are documented by excavation; four from Birnirk, one or two from Nunagiak, two from Cape Krusenstern, two from Walakpa (Stanford 1976), five from Cape Baranov, two from Paipelghak, one huge structure from Ekven (House 18), a partially revealed driftwood and whale-bone house at Neshkan (Dikov 2003 [1977]: 181). House 1 at Jabbertown had a similar whale-bone inlay in its back wall (Mason and Bowers 2009). Two structures at Walakpa were partially revealed, one with fewer horizontal members and lacking a floor, is considered a summer structure, while a more substantial winter structure contained 9 m² (Stanford 1976:93). Structures of substantial size and complexity, 10 × 13 m, occur at widely separated sites, from near Point Hope (Jabbertown), Nunagiak (Ford 1959:58), and Kugusuguruk. The unexcavated Mound F at Nunagiak was larger than other mounds, though lacked an entry, with its function as a qargi and workshop inferred from the wood-chip debris (Ford 1959:58). Kugusuguruk (Ford 1959:19–21) superficially may resemble two large structures at Cape Baranov (cf. Okladnikov and Beregovaya 2008 [1971]:6–11).

The northwest Chukchi Sea coast of Siberia shares priority for the find of a Birnirk harpoon head (cf. Mathiassen 1927:180), and the region was first proposed as the “original homeland” for Thule by Collins (1929:47) and for Eskimos by Jenness (1941:393). Birnirk occupations and burials are comparatively well attested from Capes Baranov to Dezhneva, a coastal reach of more than 2000 km. Firm archaeological data remain limited, although at least four sites have yielded sizable collections (cf. Cape Baranov;

Okladnikov and Beregovaya 2008 [1971]); and East Cape (Arutiunov and Sergeev 2006 [1969], 2006 [1975]; Bronshtein and Dneprovsky 2002; Dneprovsky 2006). Cape Bol'shoi Baranov had five large ($>100\text{ m}^2$) single house mounds and an extensive inventory that is undeniably Birnirk. The artifact assemblage offers many "Punuk" attributes that led Okladnikov and Beregovaya (2008 [1971]:123) to consider it as "transitional" between Old Bering Sea and Thule, that was "synchronous and evidently late," considering the admix of "Birnirk, Punuk and Thule types . . . in Sarychev Bay and [those] of Old Bering Sea and Birnirk . . . in Vtoraya Bay." At Cape Baranov, the large structures lacked burials and were constructed of *vertical* posts, with internal segmentation into intramural activity areas (Okladnikov and Beregovaya 2008 [1971]:8).

Architectural and assemblage commonalities with Birnirk at Cape Baranov occur at Paipelghak, Ekven House 18, and in northern Alaska. Paipelghak had a vertical post construction, slab floors, and two rooms interconnected with narrow passageways (Dneprovsky 2006). Ekven House 18 walls combined whalebone elements with wood, floored by stone slabs; similar to several Alaska Birnirk houses. A similar layout, also employed at the contemporaneous Jabbertown House 2 near Point Hope, with its 7 or 8 rooms or caches, is among the most elaborate in the western Arctic but circumscribed a limited space (Larsen and Rainey 1948:170-171). Ekven House 18 assemblage combined Birnirk and Punuk elements (Dneprovsky 2002:171), whereas the Jabbertown assemblage revealed Birnirk harpoon heads and bolas with considerable ground slate but an Ipituk-like flaking technique—representing an intermediate stage between Birnirk and Thule (Larsen and Rainey 1948:173).

MORTUARY DATA

Considering Birnirk's limited spatial and chronological extent, a substantial number of burials are attributed to it, although few are dated and many lack grave goods. Over 100 occur around Barrow: 15 from two of six Kugok burial mounds (Ford 1959:25-30), six within a defined precinct in Birnirk Mound A, three atop Mound R (Ford 1959:45, 54; Hollinger et al. 2004:44, 54), 83 within the Kugusuguruk house mounds (Ford 1959:19)—with but 53 accounted for (Hollinger et al. 2004:65), and two at Nunagiak (Ford 1959:60-61). The north shore of Chukotka offers 24 burials at Cape Dezhneva (Bronshtein and Dneprovsky 2002:152; Dneprovsky 2002:176) and 50 from the Chegitun River, northwest of Uelen (Dikov 2003 [1977]). Many Birnirk burials were within structures or houses—as at Kugusuguruk—although the Cape Dezhneva, Chegitun, and Kugok interments are within cemeteries. Wooden coffins were employed in four burials at Kugusuguruk Mound 4 (Ford 1959:20), while cobbles outlined graves at Chegitun (Dikov 2003 [1977]:173-174).

The contents of Birnirk graves vary considerably; many contain offerings, some possibly gendered, but most are spare. Potsherds, lamps, or paddles occur in several Kugok graves, with a umiaq paddle, harpoon heads, or knives in two others (Ford 1959:26-27). At Cape Dezhneva, Birnirk whalebone burials had several distinctive characteristics

relative to other cultures; for example, each one had a bola or other birding implement and faced northeast (Bronshstein and Dneprovsky 2002:154). Birnirk burials often contained artifacts of “other” cultures,” such as OBS (e.g., Kugok A Burial 6 [Ford 1959:27]). The architectural singularity and controversies about the Kugusuguruk burials include a profound disagreement over the genetic and cultural affinities of the human remains (cf. Hollinger et al. 2004, Hollinger et al. 2009; Jensen 2009). House walls and supports enclosed the Kugusuguruk burials that were deposited in three levels, within skins, laid on wood platforms, not coffins (Van Valin 1941:232). A most compelling mortuary context includes seven people on the roof of Ekven House 18 (Dneprovsky 2002:176); adjacent slat armor implies deaths as military casualties. In contrast to OBS, Ipiutak, or Punuk cultures, substantial grave goods are a more common accompaniment in Birnirk, for example, in virtually all the Cape Dezhneva burials (Arutiunov and Sergeev 2006 [1975]:35, 58, 67, 74–75), at Kugok (Hollinger et al. 2004:40–49), and within at least half of the Kugusuguruk interments, judging from Ford’s (1959:20–21) annotated maps.

Chronological Inferences for the Birnirk-Thule Transition

Like Ipiutak, the age of Birnirk is growing younger by each new dating effort. De Laguna (1947:9) located it between A.D. 1 and A.D. 500, while Larsen and Rainey (1948:155), Collins (1954:300), and Giddings (1960:124) favored a range between A.D. 500 and 900. None had a compelling rationale for the age assignments; Ford (1959:242–242) declined to offer any age estimate. Since 2000, the chronometry of the Birnirk-Thule transition has improved, moving from a reliance on solid carbon, seriation, or stratigraphic dating (Thule 2 above Birnirk) to direct AMS ^{14}C dating. Still, fewer than ten harpoon heads are securely dated (Morrison 2001:78).

Chukotka offers a rudimentary Birnirk chronology, ranging from A.D. 650 to the late thirteenth century. Two driftwood assays at Neshkan record an occupation in the mid-seventh to mid-ninth centuries A.D. (Gerlach and Mason 1992), while Cape Baranov could be much earlier, between 1 B.C. and A.D. 657, if the sole assay of 1665 ± 165 B.P. (Okladnikov and Beregovaia 2008 [1971]:123) on driftwood can be refined. Down coast, the 4 m deep Paipelghak midden witnessed several occupations (Bronshstein et al., this volume, chapter 19), one early, dated by human hair, A.D. 680–773 (1790 ± 15 B.P., UCIAMS-86240 [Raghavan et al. 2014:Table 5.3], calibrated with Khassanov and Savinetsky’s [2006] offset of 188 ± 27 yrs), another younger, based on two end-ring ages in the late thirteenth century A.D. (Dneprovsky 2004). In between, House 18 at Ekven was occupied between A.D. 800 and 1000, while at Vankarem, Birnirk, and Early Punuk, harpoon heads were comingled in a single house dated A.D. 1040–1112 and 1115–1257 (Dikov 2011 [1968]:89). The younger, eleventh-century Birnirk ages parallel several for north Alaska sites.

Most Alaska Birnirk sites are either undated or poorly dated, including Nunagiak, Utqiagvik, Walakpa, and Cape Krusenstern. The few ages available reflect occupations after A.D. 700, at Birnirk, Walakpa, Kirigitavik, and S’keliyuk. The Birnirk site benefits from nine ages mostly on archived samples, either from Stefánsson’s (Morrison 2001) or

Ford's collections (Anichenko 2013), or from shallow cores (Mason 2009a). The five direct ^{14}C ages by Morrison (2001:80) were on diagnostic Birnirk-Thule transition harpoon heads (Sicco, Natchek, Tasik) and established contemporaneity within A.D. 979–1019; however, a Thule 2 head was not dated. Three ^{14}C ages on Birnirk umiaqs fall in the early eleventh century A.D. (Anichenko 2013). Several wood ^{14}C ages fall in the seventh to eleventh centuries A.D. and likely date the basal Birnirk occupation in Mounds A, C, and E (Mason 2009b); but no ages yet refer to the superimposed Thule occupations that Carter (1966:20–21) described from Mound H. At Walakpa, several Thule 2 heads were recovered in situ, but only one age is unequivocal, if rather imprecise; compare Morrison (2001:78), A.D. 1018–1376. A wooden serving tray from Kugusuguruk offers a calibrated ^{14}C age of A.D. 665–1037 (Ralph and Ackerman 1961:5), acceptable in Morrison's (2001:75–76) view, although no diagnostic objects were directly associated (Ford 1959:20). At Kirigitavik mound, radiometric ages on charcoal were first obtained by 1990s excavations by Harritt (2004:168), recording Early Thule A.D. 900–1190 at 1.8 m below surface bs, associated with a Sicco harpoon head, at the level of a Thule 2 harpoon head (Yamaura 1984:239) from Collins's collection. On St. Lawrence Island, a pseudo-Birnirk occupation at S'keliyuk, east of Kukulik, had Thule 3 harpoon heads from Level 3, dated 955 ± 80 B.P. (WSU-3209), A.D. 963–1255 (Ackerman 1961:209, 211; 2012; written communication).

Several sites combine Birnirk and Thule harpoon heads and fall within the eleventh to fourteenth centuries. Thule House 1 at Deering yielded dendrochronological evidence for a Thule 2 head, an end ring age of A.D. 1203 (Bowers 2009:84, 88, 100), while a fourteenth-century A.D. occupation within House 21 at Cape Espenberg at KTZ-304, also contained a Thule 2 head (Hoffecker et al. 2010). Cape Krusenstern had Birnirk and Thule intermingled within Houses 7 and 8 (Giddings and Anderson 1986:Plates 44, 35), with Natchuk and Thule 2 types (Giddings and Anderson 1986:80). Although neither House 7 nor 8 was dated, nearby House 6 reported a Tuquok and Thule 2 harpoon head (Giddings and Anderson 1986:74, Plate 35) associated with five ^{14}C ages in the mid-eleventh to early thirteenth centuries A.D. (Anderson and Freeburg 2013:65), while House 25 had three Thule 2 heads and the solid C assay within the twelfth to thirteenth centuries. Near Point Hope, Jabbertown House 2 (Larsen and Rainey 1948:170–175) produced Natchuk harpoon heads dated to the tenth to eleventh centuries A.D., and an occupation a century later (Mason and Bowers 2009). To the north, Uivaaq at Cape Lisburne had a Thule 2 harpoon head within levels dated to the eleventh to twelfth centuries A.D.

Mortuary contexts with undeniably and dated Early Thule offerings remain few and scattered; despite the dozens of likely Thule burials at Nuvuk that are dated to the eleventh to fourteenth centuries (Jensen 2009). Only one, Nuvuk Burial 1, contained diagnostic objects and dated between A.D. 780 and 1000 on a Sicco harpoon head (Jensen 2007), a “direct copy” of Punuk type-III ax (Ford 1959:76).

The ambiguity of Thule 2 harpoon heads as index fossils is exemplified in its lengthy persistence or curation for centuries after A.D. 1200, e.g., between A.D. 1200 and 1400 within the Utqiagvik Mound 44 slump (Mason et al. 1991:61). Although a rarity within Kukulik mound, Meat Cache 35 (Geist and Rainey 1936:Plates 63–64) contained a Thule 2 head associated with a wood-drying rack that dated to A.D. 1301–1367, 1382–1434

(Houlette 2009:109, 111). Significantly, the youngest Birnirk occupations, at Paipelghak, Cape Espenberg, also date to the thirteenth or fourteenth centuries, so that the precise length of the Birnirk-Thule transition remains uncertain, within the range A.D. 700–1300, but centered on A.D. 1000.

CONCLUSIONS

Six principal regions are possible locales for the origin of Thule and each offers data of varying quality in support of Thule origins, both in artifact and faunal assemblages, according to Mathiassen's (1927:183) criteria, which emphasized sea ice, abundant driftwood, and whale hunting. The regions are:

- (1) The northeast Chukchi Sea coast, northern Alaska, from Icy Cape to Point Barrow;
- (2) the north Chukchi Peninsula coast, Cape Baranov to Ekven;
- (3) Cape Prince of Wales;
- (4) St. Lawrence Island;
- (5) Beaufort Sea to Coronation Gulf;
- (6) Eastern Aleutians.

For each region, as discussed herein, the archaeological record differs in historiographical and national perspective (Russian, American, Danish, Canadian), its reliance on older data, state of reportage, and site preservation. On the Beaufort Sea, intensified coastal erosion (Reimnitz et al. 1988) since 1950 has precluded a long-term record. Archaeological survey data for many areas are limited and up to 70 years old. Four of Mathiassen's zones are adjacent or close to Bering Strait, including St. Lawrence Island, both coasts of the Chukchi Peninsula, the Diomedes, and Seward Peninsula.

No locality offers evidence for occupations preceding 250 B.C. and, certainly, none provides any direct continuity with the Arctic Small Tool tradition, although I have argued for Old Bering Sea links to the Northern Archaic tradition (Mason, this volume, chapter 17). The similar deep-time perspective of Crockford (2008) is too general to be of use in illuminating Thule origins. The initial settlement of both St. Lawrence Island and Cape Dezhneva does likely precede 100 B.C. and, universally along the Chukchi Sea coasts and Bering Strait, OBS cultures arise *ex nihilo* (Mason, this volume, chapter 18) and remain the likeliest ultimate origin for Birnirk culture and the succeeding Thule tradition. A looming uncertainty is the precise locality or society responsible for transforming Old Bering Sea into Birnirk, then Thule, or into Thule/Punuk, in Collins's (1964) term. Two circumstances are illuminating: (1) the longstanding knowledge that Old Bering Sea was present, interstratified possibly, in the Birnirk-type site (Carter's view, but not Ford's), and (2) Chukotkan Birnirk sites, Cape Baranov and Paipelghak, are underlain by OBS occupations—unlike at Wales, St. Lawrence Island, or Cape Dezhneva. In northern Alaska, the Birnirk to Thule hearthland still shines strongest within the Barrow triangle

from Nunagiak to Point Barrow (Carter 1966; Ford 1959). The Beaufort Sea littoral, from Barrow into western Canada, is bereft of OBS, Punuk, or Birnirk occupations, probably not exclusively due to erosion. Both in Alaska and in western Canada on the Mackenzie River, few or no Birnirk people penetrated very far inland, prior to the thirteenth-century Thule expansion: Giddings's (1952) view, as bolstered by additional data (Shirar 2011). In sum, the OBS-Punuk-Birnirk-Thule transition or continuum occurred along the northern Chukchi Sea coast, although no certainties allow the validation of one coast over the other, so that establishing Thule origins in *either* Siberia *or* Alaska remains the grail—as at the dawn of Arctic archaeology in the 1940s.

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CHAPTER 21

ARCHAEOLOGY OF THE LATE WESTERN THULE/ IÑUPIAT IN NORTH ALASKA (A.D. 1300–1750)

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THE Thule culture is the most recent archaeological manifestation of the Neoeskimo or Northern Maritime tradition (Collins 1964), called the Arctic Whale Hunting culture by Larsen and Rainey (1948). The Early Thule culture developed, apparently from Birnirk and Punuk roots, in northern Alaska and spread rapidly across the North American Arctic (cf. Collins 1964; Friesen, this volume, chapter 28; Mason, this volume, chapter 20; Mathiassen 1927). Early Thule people were maritime-adapted, living in permanent winter settlements of substantial semisubterranean sod-covered houses, with a subsistence base focused on the hunting of bowhead whales as well as seals, walrus, and caribou. As time passed and populations grew, these people developed more specialized regional cultures from Alaska to Greenland.

The Alaskan regional variant is referred to as Late Western Thule (LWT), following Larsen and Rainey (1948:170–175) who referred to the phase of the Arctic Whale Hunting culture following Birnirk at Point Hope as Western Thule. Larsen and Rainey (1948:175–178) posited Western Thule culture as the source of the Thule migration and applied specific regional designations (e.g., Tigara) to succeeding groups. Thus, Western Thule would be synonymous with Early Thule. Many archaeologists use the term Western Thule to refer to subsequent western Arctic Thule-related groups as a unit, creating terminological confusion. The Early Thule peoples of north Alaska are the direct ancestors to the diverse regional precontact and modern Iñupiat Eskimo cultures of northern and northwestern Alaska (Burch 1998, 2006; Sheehan 1985, 1990, 1997; Spencer 1959).

CHRONOLOGY

The pioneering excavations in the region were conducted before the development of ^{14}C dating, so artifact seriation of harpoon heads and arrowheads supported chronological inferences (Ford 1959). Giddings's (1952) dendrochronology along the Kobuk River provided absolute dates for construction of individual houses, leading to the assignment of distinctive harpoon head types to 100- to 150-year time spans, based on their occurrences in Arctic Woodland Culture sites along the Kobuk and at Kotzebue (VanStone 1955). Consequently, sites throughout the Alaskan Arctic containing those types were assigned dates. This is a bit ironic, since Giddings's definition of an Arctic Woodland Culture was firmly tied to the forested riverine environment along the Kobuk, more so than to a group of people.

Dendrochronology served as the best option available before radiocarbon dating, but perhaps was overly optimistic and premature. Because of the wide acceptance of ^{14}C dating by 1960, coastal sites were not tree-ring dated. While Giddings's (1952) chronology may hold reasonably well in the Kobuk valley and nearby areas, radiocarbon dating of diagnostic harpoon heads from the Barrow area (Jensen 2009a: 52–53; Mason 1991:64–80; Morrison 2001:79–82) and, to the south, at Nukleet (Murray et al. 2003) indicates these types were in use longer than previously thought. Morrison (2001) demonstrated that, near Barrow, harpoon heads considered early (“Natchuk” or “Sicco”) or late (“Tasik”) were in fact contemporaneous, ca. A.D. 1000. At Utqiagvik, Mason (1991:65, 68, 80) also found that Kilimatavik, Nunagiak, Utkiavik, Brower and Barrow harpoon heads types were employed at Barrow a century or so before their use in the Ekseavik or Old Kotzebue sites of the Kobuk region. Farther south, Murray et al. (2003) tested the applicability of the Kobuk chronology by direct dating of harpoon heads and arrow points of “diagnostic” types from Nukleet and Iyatayet. Again, many were in use longer than the century periods Giddings had proposed. Shirar's (2013) radiocarbon dating of additional samples from Giddings's Kobuk sites pushed back dates for initial occupation at Ekseavik and Ambler Island about 50–100 years. This resolves some inconsistencies, but only by indicating that the sites are not tight temporal units and thus particular types are not tightly temporally diagnostic. The foregoing implies that dates assigned to sites at a distance from the Kobuk Valley based on harpoon head or arrowhead typological similarity to sites on the Kobuk River are not definitive.

After the invention of radiocarbon dating, Alaskan sites were among the very first to be dated (Rainey and Ralph 1959:367–368). As ^{14}C dating developed, archaeologists realized that marine mammal samples were not ideal for dating due to the “old carbon” effect (McGhee and Tuck 1976). Wooden artifacts and structural elements were usually made of driftwood, and decades might have elapsed before human use of the wood. Although attempts were made to rectify the problem by comparisons with paired marine and nonmarine samples (e.g., Dumond and Griffin 2002), most projects ran few radiocarbon dates.

Giddings developed beach ridge chronology to resolve questions about the dating of the Denbigh materials (Giddings and Anderson 1986). It rests on the assumption that as beach ridge complexes formed, people would always choose to live on the oceanfront ridge. Further, Giddings assumed that all sites on a ridge were contemporaneous, so a date on a single site gave an approximate date for all materials on the ridge. While this worked for Giddings's limited goals, it is less satisfactory for fine-grained chronology, since recent research in Kotzebue Sound has shown simultaneous use of multiple ridges (Darwent et al. 2013; Anderson and Freeburg 2013).

Assumption of contemporaneity of structures on a ridge or in a settlement is problematic. These date assignments are applied to features other than the one from which the material derived, and to artifacts from these features, and the results are often uncritically used for typological cross-dating at other sites. The result is an imprecise and circular chronology, which requires thoughtful reexamination.

To resolve these dating issues, I adopted a conservative approach to refining the LWT chronology, designing a protocol using sites with dendrochronological and/or high-quality radiocarbon dates. I assembled all the available published dates for putative Late Western Thule sites in Alaska. I then attempted to track each date to its source and assemble relevant information, and, finally, to assess the reliability of each assay. This included the type of date (radiocarbon, dendrochronological, typological, stratigraphic, beach ridge chronology, or guesstimate), as well as information about the item dated, raw material, associated artifacts, stratigraphic position, possibilities for contamination, related dates, and other information to assist in evaluation. The last step involved scoring dates on these criteria, modifying Krasinski and Haynes's (2010:43) system to accommodate nonradiocarbon dates. All radiocarbon dates were recalibrated using OxCal 4.2 (Bronk Ramsey 2009) and the IntCal13 and Marine13 calibration curves (Reimer et al. 2013). In total, 390 verifiable dates were assembled, of which 299 were judged reliable for analyses.¹

Securely dated Thule sites in north and northwest Alaska with occupations dating prior to A.D. 1300 are preferentially located along the coast. Nuvuk, Birnirk, Utqiaġvik, Walakpa, Jabbertown (Qimiarzuk), and Deering were occupied between A.D. 1200 and 1300 (Jensen 2009a, 2009b; Mason 1991, 2000; Mason and Bowers 2009, Morrison 2001; Stanford 1976; Zimmerman et al. 2000). The large coastal sites of Cape Espenberg and Cape Krusenstern offer a small number of published ¹⁴C dates from this period (Gerlach and Mason 1992; Giddings and Anderson 1986; Hoffecker and Mason 2010), although most dates lack associated cultural material. The only securely dated site distant from the coast is Ahteut on the Kobuk River, with five tree-ring dates from a structure occupied in the early thirteenth century (Giddings 1952). The caribou crossing or hunting site of Onion Portage has two contradictory ¹⁴C dates from House 13, considered an Ahteut structure (Anderson 1988:134). Artifact comparisons (e.g., Mathiassen 1930) suggest occupation of the Beaufort Sea coastline ca. A.D. 1300, at sites on Thetis and Pinguk/Pingok Islands, although no solid dates are available.

Coastal occupations continued at major sites throughout the LWT period. In the earlier years, roughly A.D. 1300–1400, far fewer sites offer firm dates, probably due to researchers' bias toward dating initial occupations. Alternatively, this may reflect a

reduction in occupations at places like Cape Krusenstern and Cape Espenberg, less suitable for whaling than prime locations like Wales, Point Hope, or Point Barrow (cf. Savelle and McCartney 2003). Inhabitants at coastal LWT sites poorly situated for whaling shifted subsistence focus to a combination of fishing and sealing, with beluga drives playing some role in communities around Kotzebue Sound. Coastal settlements distant from the major sites were also established.

The increased number of LWT sites over time suggests demographic growth. Further, the presence of LWT sites across a wider range of ecological settings indicates that people were diversifying subsistence economies and establishing permanent settlements at new locations, many used by earlier cultures, or transiently or seasonally. These include Ekseavik, on the middle Kobuk River; first occupied by about A.D. 1400, as well as the Old Kotzebue site (Giddings 1952:107). Indications are that LWT peoples had begun to use the Brooks Range, at least for fall caribou hunting, by the beginning of the fifteenth century (Gerlach and Hall 1988). Sikoruk has a single tree-ring date of A.D. 1410, associated with its earliest LWT occupation.

During the sixteenth century, population growth continued, accompanied by a change in technological emphasis. In the Kotzebue Sound and Kobuk River area, based on the artifacts found at sites like Intermediate Kotzebue (Giddings 1952:36–38), fishing seems to have relied increasingly on nets, perhaps to feed growing populations. The quantity of slat armor elements found in coastal sites like Kotzebue (VanStone 1955), Tikigaq (Tigara) (Larsen and Rainey 1948) and Utqiagvik (Sheehan 1990, 1997) increases from the few pieces in earlier sites (Collins 1937). Slat armor, used only for defense in interpersonal conflict, is likely a sign of heightened social tension (Cooper and Bowen 2013; Sheehan 1997) and feuding, if not full-scale warfare, as some contend (Mason 2009a:111; 2012). Perhaps not coincidentally, sites in less accessible locations were settled during this period, although such sites may be underrepresented due to survey difficulties. This includes permanent interior settlements away from major rivers. The West Village at Kuzitrin Lake, in the central Seward Peninsula, has a ^{14}C date of A.D. 1535 ± 80 (Schaaf 1995), and Kangiguksuk, on the middle Noatak, has a dendrochronological date of A.D. 1578 (Hall 1971). Ayak, on Sledge Island just off Cape Nome, was first occupied around the end of the sixteenth century (Harritt 2010). The undated precontact cindercone villages on the Seward Peninsula clearly were sited with defensibility as a primary consideration (Schaaf 1995). There seems to have been additional infilling of the coast, with occupations at Pingusugruk on Point Franklin (Sheehan et al 1991) and at additional sites in the Ikpek area at this time.

Increases in permanent use of the interior by LWT people continued through the end of the period. Maiyumerak Creek, with a faunal assemblage reflecting a riverine or interior subsistence orientation, has radiocarbon dates indicating occupation in the latter half of the period, possibly later (Shirar 2009). Ambler Island, on the upper Kobuk, was occupied late in the period, between A.D. 1730 and 1760, based on dendrochronology (Giddings 1952). This movement to the interior and eastward across the Brooks Range represents a displacement of the previous Athapaskan occupants of the area (Campbell 1962), later stages of which are documented through oral history (e.g., Burch 1998).

ECONOMY

Based on the evidence of tool types and raw materials represented in artifact inventories, as well as the limited zooarchaeological data available,² the LWT economy centered on hunting and fishing, with gathering playing a limited role (Stanford 1976). During the earlier LWT period, when residence was mainly along the coast, the primary focus was marine mammals, including whales, although caribou were an important secondary resource for dietary variation and as a raw material source. Migratory birds and fish contributed to the diet. As settlements were established away from the most reliable whaling and marine mammal hunting sites, people refocused subsistence efforts on locally available species.

Residents of settlements along larger river systems such as the Kobuk, Noatak, Colville, Meade, Chipp-Ikpikpuk, and Utokok, generally focused on fishing, with secondary emphasis on caribou. Some sites, such as Onion Portage (Anderson 1988), were close to caribou crossing sites where an entire winter's supply could be taken during the fall migration. Seals and belugas can travel some distance up such rivers in pursuit of fish, and were presumably taken when available. Some interior residents spent a portion of the year on the coast pursuing marine mammals. This is documented ethnographically for the Utokok and Noatak drainages, and archaeological indications are that similar arrangements applied during the precontact period (Giddings 1952:54–58).

As Brooks Range settlements were established away from larger rivers, their residents shifted their subsistence base further, relying on caribou and lake fish (Hall 1971; Shirar 2009). Since caribou herds fluctuate widely in number (e.g., Morneau and Payette 2000; Gunn 2003), such settlements probably would not have been sustainable in the long term without trading relationships with coastal settlements, which provided both a way to buffer subsistence shortfalls, and connections in other locations where people could move if necessary.

TRADE

An extensive traditional trading network operated throughout the North by the beginning of the LWT period. Old World goods like bronze (Cooper et al. 2016), and glass beads (Kunz et al. 2005) reached north and northwest Alaska through this network long before Euro-Americans did, possibly through middlemen from Bering Strait islands. Asian iron is known from St. Lawrence Island Neoeskimo sites (Bandi and Blumer 2004; Collins 1937:303–305), as well as Ipiutak (Larsen and Rainey 1948:83) sites, and was clearly available in small quantities for those who had means to trade for it. Small numbers of steatite vessels, presumably from the central or eastern Arctic, were reaching north and northwest Alaska by the end of the LWT period (Ford 1959; McCartney and Savelle 1989).

A thriving trade existed in Alaskan commodities that varied in availability from area to area, including lithic raw materials like jade (Giddings 1952), obsidian, and chert (Rasic, this volume, chapter 5); and possibly wood from the Mackenzie River delta to north Alaska, where large logs were scarce (Sheehan 1997). Raw material for tools, such as ivory and beaver teeth, was also crucial (e.g., Jensen 2007, 2009b:248), as were the significant amounts of marine mammal oil and other marine mammal products traded from the coast to inland groups in exchange for caribou skins taken at the proper time. Sheehan (1997:174–175) argued that cross-regional trade was necessary to support any sustained inland occupation, which, in turn, was extremely beneficial in procuring the quantities of interior products desired by major whaling settlements. Some items, such as beaver teeth, probably were traded across ethnic boundaries since the closest beaver habitat was in Athapaskan territory.

By the time of sustained contact with Europeans (Jensen and Sheehan, this volume, chapter 26), ca. A.D. 1700, established trade fairs are recorded at Sisualik in the Kotzebue area (Burch 2005:180–192), at Point Spencer on the southern Seward Peninsula (Ray 1975:98), at Nigliq near the mouth of the Colville River (Maguire 1988:456; Spencer 1959:21, 200; Simpson 1855:265), on Barter Island (Simpson 1855:268), and likely also in the Icy Cape area (Burch 2005:197–198) and at Pigniq or Birnirk (Burch 2005:195–197).

TECHNOLOGY

The LWT and precontact Iñupiat employed an extensive and complex suite of technology in order to survive in the relatively harsh environment of north and northwest Alaska.³ The toolkit derived from the Birnirk and Punuk cultures, the immediate predecessors of the Early Thule and the LWT. The LWT toolkit did not include many new tool types; rather, existing systems of technology were refined and modified, producing forms better adapted to local conditions. As LWT people established settlements away from prime coastal whaling sites, the toolkits found were adapted to primary mode of subsistence and the locally available raw materials.

One exception is slat armor, first found in substantial quantities by the fourteenth century (Mason 2009a:111–113, Mason 2012). Slat armor, known from Punuk sites, appears derived from Siberian armor (Collins 1937). Nearly all slat armor occurs at coastal sites, particularly large whaling villages. This suggests a change in the regional sociopolitical situation, due to either external factors or increasing populations and attendant pressure on resources and competition for hunting access.

Due to the excellent preservation at many LWT sites, particularly in the north, knowledge of LWT technology is remarkably complete. Since most of the LWT toolkit continued in use a century after contact, in some cases substituting trade goods for traditional raw materials or manufacturing tools, our understanding of tool functions is excellent (Murdoch 1892).

HUNTING AND FISHING TECHNOLOGY

Marine mammals (small seals, bearded seals and walrus) were hunted in open water or on ice floes from skin boats (kayaks or umiaqs) with toggling harpoons or darts thrown by hand or with the assistance of a throwing board.⁴ Ringed seals, which maintain breathing holes through fast ice, were taken there with thrusting harpoons or while they basked on the ice in the spring. Late in the period, nets set under ice or in ice-free water were also used. Bowhead, and possibly gray, whales were taken from umiaqs launched from the ice edge or from the shore, using specialized large toggling harpoons. Belugas were driven into shallow water where they could be killed and butchered, although they could be taken with the larger toggling walrus harpoons.

Caribou were hunted with bow and arrow or with spears. Extensive complexes of caribou drive lines, which channel migrating caribou to good interception spots, and hunting blinds occur across northern Alaska, some predating the LWT by several millennia. Caribou are vulnerable when swimming and float well after killed, and spots like Onion Portage, where they could be taken in the water with spears from kayaks, were used repeatedly. There is evidence in the form of cached horn (e.g., at Pingusugruk) that muskoxen were present during this period, and they were probably taken with the same weapons.

Fishing employed a variety of hooks, lures, and nets, as well as leisters for larger fish. After freeze-up, nets were set under the ice or holes were chopped to allow jigging, with special scoops used to remove the ice. Blunt arrowheads indicate that birds were taken by bow and arrow. Bolas represent another means of taking birds without damage to the delicate skins. Bird darts with side prongs also were employed.

Harpoon Heads

Any discussion of LWT hunting technology must include harpoon heads, a vital component of the Neoeskimo marine mammal hunting toolkit. Toggling harpoon heads are often treated as a type of “index fossil” (Figure 21.1) for Neoeskimo sites (Ford 1959; Stanford 1976). Prior to ¹⁴C dating, considerable effort was expended in developing typologies and seriation (e.g., Ford 1959:231–238, Figures 34, 113, 114, 115, 116; Mason 2009b; Mathiassen 1927; Stanford 1976:108).

Several general trends in the technological development of harpoon heads are apparent (Figure 21.1). Birnirk and Early Thule sealing harpoon heads were primarily open socket.⁵ Over the Late Western Thule or Iñupiaq period, closed sockets replaced open sockets, so that contact-era sites contain almost exclusively closed-socket harpoon heads (Larsen and Rainey 1948:176, Ford 1959, Hall and Fullerton 1990). The multiple spurs, chert side blade insets, small ornamental barbs and elaborate decoration present on many earlier harpoon heads were largely absent by Early Thule times, and even vestigial side blade slots were rare. Later, the use of harpoon heads with multiple pairs

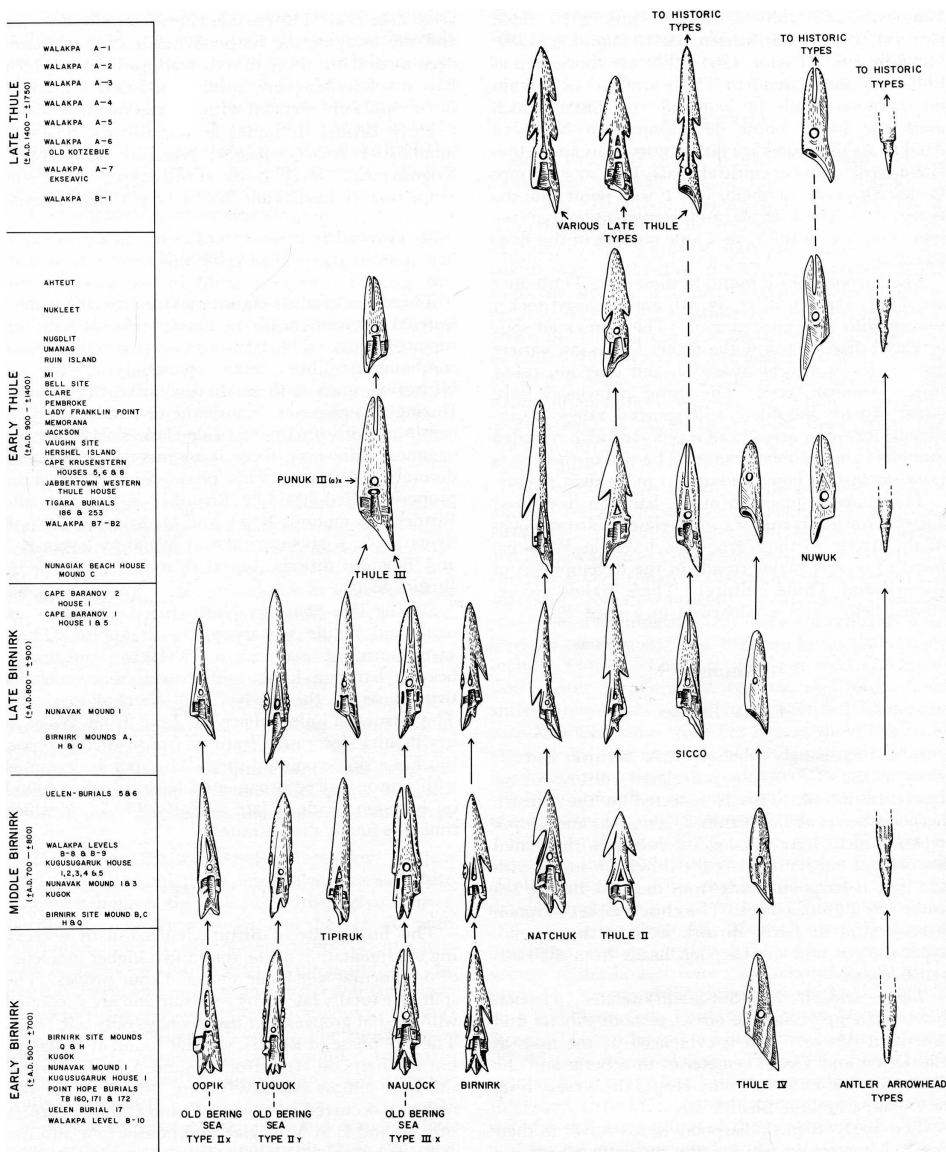


FIGURE 21.1 Use of Late Western Thule harpoon head typology for chronological purposes. The original age assignments, at left, require revision in light of concerns with sample hygiene requirements, as discussed in the chapter. Illustration from Stanford (1976:108), used with permission.

of barbs appears; likely derived from toggling types, notably the Thule-2 form, but the arrangement of barbs and the location of the line holes suggest that they were not intended to toggle (Ford 1959:87-89).

Preferred raw materials vary across the region, with antler dominant in the north and walrus ivory more common moving southward. Bering Strait and St. Lawrence Island

sites contain primarily ivory harpoon heads. Whaling harpoon heads were closed socket throughout the LWT period, usually manufactured from ivory in the south, while whalebone was more typically used near Barrow.

While radiochronometry indicates that harpoon heads are sufficient to distinguish Birnirk from Late Precontact (Morrison 2001), they are not useful for extremely precise dating. The variations in morphology that enables archaeologists to discern so many types has not been adequately explained. Some suggest harpoon head types served as ethnic markers; this seems unlikely as the sole explanation for the variability. In many instances individuals were buried with multiple harpoon head types (Jensen 2009a) and most residences contained multiple types. This suggests that the variations were primarily functional, not solely a means of signaling identity. Given that the harpoon head was a critical piece of technology, it seems more likely that individuals would use types which they and their fellow hunters found suited to particular circumstances, while trying out small modifications which individuals thought might represent improvements. Beneficial innovations undoubtedly propagated in a rapid fashion, explaining why certain types, notably Thule-2 and derivatives, persisted for long periods, while other types (e.g., Sicco and the morphologically identical III-a-x) were more time-restricted. Other types seem restricted in both time and space, suited for local conditions, being replaced elsewhere as soon as more locally suitable types were developed.

TRANSPORTATION

LWT people traveled on water and on the solid surfaces of the land and the sea ice (for extended discussion, cf. Burch 2006; Maguire 1988; Murdoch 1892). Pieces of both kayaks and umiaqs, most commonly driftwood frame parts and paddle fragments, have been recovered from LWT sites (Stanford 1976). The skin covers are rarer, but both the distinctive waterproof stitching and specific sewn parts of a kayak cover have been identified by archaeologists and experienced skin sewers (e.g., a kayak cover identified by Bertha Leavitt during the Ukkuqsi excavations). It is unknown if there was more than one size of umiaq (a large traveling umiaq and a smaller whaling umiaq) in use during this period.

In winter, cross-country travel on land was by dog sled. Sled parts, particularly whalebone sled shoes, are very common in LWT sites. Snowshoes are primarily recovered from mountain and wooded areas. Whether this is due to lack of material for their manufacture, or simply that snow conditions in other areas rarely required snowshoes, is unclear. Small baleen toboggans, presumably hand-drawn, have been recovered from LWT sites including Utqiagvik (Sheehan 1990, 1997:135) and Pingusugruk. Some are elaborate, with baleen cross-members, tie-down loops, and up-curved fronts, while others are just a fan of baleen strips.

ARCHITECTURE

LWT people did not occupy the same dwellings year round. At contact, permanent winter houses were generally occupied throughout the winter and into spring (Lee and Reinhardt 2003). As significant snowmelt occurred, people moved into temporary structures, including tents, which could be erected in the village, used at seasonal camping sites, or while traveling. The available archaeological evidence suggests that this pattern has some time depth, although certain segments of the seasonal round are better known than others. However, practical considerations, such as the fact that winter houses become uninhabitable due to flooding by meltwater, suggest that similar practices were followed before contact.

Winter Houses

More is known about winter houses of the Western Thule people and their LWT descendants than about dwellings for other seasons. Nearly all excavations in the region have focused on the deep, readily identifiable coastal or riverine winter houses (e.g., Ford 1959; Giddings and Anderson 1986; Hall and Fullerton 1990; Larsen and Rainey 1948).

LWT winter houses were semisubterranean, generally rectangular, although some were slightly trapezoidal in shape and some had rounded corners (e.g., Bockstoe 1979:66–76; Darwent et al. 2013; Sheehan 1990). They were entered through a tunnel, usually extending from the south of the house in the northern part of the region (e.g., Ford 1959; Sheehan 1990; Sheehan et al. 1991; Stanford 1976). From Point Hope south, the orientation is more variable, although the tunnel entrance is usually toward water (e.g., Bockstoe 1979:66; Giddings 1964:122; Larsen and Rainey 1948). Often, there was a separate kitchen off the tunnel or the main room. The main room had a floor, generally of split logs or planks in north and northwest Alaska, and one or more raised sleeping benches. Walls and roof supports were typically constructed of wood, although whale-bones could be used, particularly as part of the entrance tunnel, roof, or sleeping platform supports (Bockstoe 1979; Darwent et al. 2013; Ford 1959; Giddings 1952, 1964). A gut window, located in the southern-facing pitch of the roof, provided illumination and released heat and smoke. The entire structure was covered with sods for insulation (Sheehan 1990:194–195).

In some cases, multiple houses shared a single entrance tunnel (e.g., Bockstoe 1979:67; Darwent et al. 2013). There are apparent cases of more elaborate multiroom structures (e.g., Giddings and Anderson 1986:60; Larsen and Rainey 1948:171), although some may represent multiple structures built over a period of time, as on Mound 34 at Utqiagvik (Sheehan 1990, 1997). Although none is well dated, artifact typology suggests that such structures were more common in the early part of the period, which also accords with the apparent presence of early multiroom structures at Birnirk (Ford 1959). Houses were repaired and altered as needed, in some cases to expand or reduce the

living area, as at Pingusugruk. Wall and roof sods were added to or replaced as necessary to maintain the dwelling.

LWT houses represent the continuation of the architectural designs of earlier Neoeskimo houses (Bockstoe 1979:66–77; Collins 1937; Ford 1959:33–56, 61; Giddings and Anderson 1986:58–71). Although most Birnirk houses lacked cold traps, an architectural feature where the floor of the tunnel is lower than the floor of the house, they were usually present in Early Thule houses, and continued in use until after contact in many areas. Oil lamps generally provided heat and light in the house. Kitchens also generally show evidence of a wood fire (Sheehan 1990). Most earlier houses have a single sleeping platform at the back and few or no interior house posts (Giddings and Anderson 1986).

In the earlier LWT period, winter houses across the region were broadly similar in design, but over time architecture became more specialized, apparently as a response to local conditions and availability of raw materials. A winter house in the interior of the Arctic Coastal Plain on the Meade River was constructed from stone slabs, with little use of wood (Hamilton 1960). Builders of houses in areas with plentiful wood, such as the Seward Peninsula, Kotzebue Sound, and the Kobuk River valley, were more profligate in their use of wood (e.g., routinely using split half logs for floors, rather than making several planks from a log; horizontal wall logs; interior house posts) than were coastal North Slope residents, where driftwood was scarcer and trees were hundreds of kilometers distant (Bockstoe 1979:66–71; Giddings 1952:13–27; Giddings and Anderson 1985:41–43; Slaughter 1982). Late LWT houses in areas with plentiful wood usually had central fireplaces, rather than relying on lamps. Such houses also lack kitchens, implying that the fireplace was used for food preparation. While LWT houses along the windy coast continued to be built with long tunnels, later houses in more sheltered areas like the Kobuk valley, have much shorter tunnels.

By the later part of the LWT period, the Iñupiat had begun to displace the Gwii'chin in the Brooks Range. At the few sites excavated, the LWT had used the lighter timber available locally, combined with moss and hides, for winter housing. These houses had interior house posts and a central hearth with side benches, a pattern evident on the Seward Peninsula and along the Kobuk River (Lee and Reinhardt 2003). A similar arrangement is seen in Norton and Ipiutak structures (Bockstoe 1979:31–42; Giddings 1964; Giddings and Anderson 1985:150–152) in the area.

Tents

During the summer, people appear to have resided in tents. Although excavations have concentrated on winter houses, a few tent sites have been excavated almost by accident. Based on ethnographic information, the skin tent and its support structure were portable, and typically not cached at the use site (Lee and Reinhardt 2003:94–100). Thus, few structures were preserved and archaeological data for the structures are lacking. What remains is evidence of the heavier components, the fireplaces and activity areas. In coastal areas, larger driftwood logs or whale mandibles, vertebrae, or ribs were used to weigh down

tent walls (Stanford 1976:92–93). Away from the coast or wood sources, large cobbles and boulders served the same purpose.

Qargiich

To date, only a single LWT qargi has been excavated (Sheehan 1990, 1997: 97–167). The structure differed from the residences at Utqiagvik; the framing was entirely of whale-bone, in contrast to the primarily wooden houses. The qargi lacked a tunnel, having only a simple surface entrance. Part of the floor was of wooden planks, presumably a dance floor, while the remainder was bare dirt, with a bench along the back wall. Interior pits held evidence of food storage. Recovered artifacts included items apparently cached for repair, items in the manufacture or repair process, and manufacturing debris. Interestingly, the subfloor contained many elements of a whale skeleton, and in fact, the entire structure can be considered a symbolic re-creation of a whale, inside of which the crew carried out both routine and ceremonial activities (Sheehan 1997:144–153).

MORTUARY PATTERNS

Neoeskimo, including LWT, mortuary practices have received comparatively little attention (Larsen and Rainey 1948; cf. Crass 1998:3). Recent excavations of a large cemetery at Nuvuk, with over 80 graves, provided data from Early Thule (Jensen 2007) through contact (Jensen 2009a, 2009b). The Nuvuk analysis collates the available information on precontact burial practices across the region (Jensen 2009b:36–59). This work provides an understanding of characteristic Alaskan Thule and LWT mortuary practices, including the structure and orientation of graves, and the nature of grave goods.

Comparisons between Neoeskimo cemeteries indicate an underlying pattern to the structure of the burials. The differences in the material used for burial construction are a function of locally available raw materials rather than cultural preference. For example, there is significant use of stone in burials on St. Lawrence Island (Bandi and Blumer 2004). On the coastal North Slope, where large rock is seldom available, there are no examples of the use of rock in grave construction in the Nuvuk (Jensen 2009b) or Point Hope (Larsen and Rainey 1948:175) cemeteries. The basic plan of these graves is a six-sided “container” for the remains, with material above and below as well as on all four sides. Although often referred to as coffins in the literature, there is no evidence that any graves contained a box-like object that was moved as a unit.

The “ideal” grave structure, not always fully realized, was constructed by placing some material for flooring in a shallow depression, and surrounding it on all sides with a wall-like frame of wood, whalebone, or stones. Some form of “bedding” was placed atop the flooring material, and the individual was then laid on that. A wood or whale-bone cover was sometimes placed over the individual, although possibly perishable

items such as skins were substituted but are not preserved. Grave construction was simplified through time. While most Birnirk burials near Barrow had flooring, none is found in the Nuvuk burials, and Larsen and Rainey (1948:175) did not mention it at Tikigaq. Covers appear on some Nuvuk burials, but vary considerably in their extent. Preservation issues in the more southerly sites may influence whether any cover is detected during excavation.

Individuals were generally interred on their backs, usually with knees flexed. Arms were folded on the chest or abdomen. In a few cases, individuals were interred on their side with knees flexed (e.g., Jensen 2009b; Larsen and Rainey 1948). The majority of graves appeared to have been oriented so that the deceased's heads were pointed toward the ocean or other nearest major body of water.

Burials are progressively shallower throughout the LWT. Depth measurements from Nuvuk (Jensen 2009b), coupled with Larsen and Rainey's (1948) descriptions and the fact that many burials today have some surface indication, suggest that these burials were never particularly deep. The conclusion of the trend toward shallower burials may be the pre-contact and contact era practice of surface "burial" in which the deceased was laid to "sleep on the tundra" accompanied by some of their belongings. Wooden coffins and subsurface burials were readopted because of postcontact missionary influence. On occasion, individuals apparently were buried near where they died, presumably when the use of an established burying ground was inconvenient or impossible.

Grave Goods

Most excavated Early Thule and LWT graves held no grave goods. There must have been status differences between individuals in these cultures in life, based on differences in house contents, as well as the presence of whaling and qargiich, which demonstrate a degree of status differentiation (Sheehan 1997). The basis for differences in grave structure and grave goods cannot be satisfactorily demonstrated; neither age nor sex explains the distinctions, as elaborate burials include male and female, adult, and child. Some of the most elaborate burials at Nuvuk held either an infant or a single adult humerus (Jensen 2007, 2009b), not a high-status individual. The Munson burials in Kotzebue, of a man and a woman, both had numerous grave goods (Guyer 1996). The problem is complicated by the rarity of "richly appointed" burials, which makes getting a sufficient sample size for robust statistics problematic.

Another trend is toward a reduction in the amount of grave goods in general (Larsen and Rainey 1948:175; Jensen 2009b:199–200). The earliest burial at Nuvuk, between A.D. 800 and 1000, contains significantly more grave goods than later graves (Jensen 2009a, 2009b). Staley and Mason (2004) argue that the decrease may result from increasing population, leading to a decreasing surplus available for removal from daily life through inclusion as grave goods. Ethnographic reports of only the worst of a person's possessions becoming grave goods suggest the trend may have continued into the postcontact period.

THEORETICAL AND METHODOLOGICAL CONCERNS

Significant unresolved theoretical and methodological issues and data limitations remain concerning the Late Western Thule culture. Resolving them would facilitate use of the direct historical approach to link ethnography and oral history with the archaeology (Burch 2010), thus enriching our understanding of the archaeology. Improvements in data quality would allow researchers to address important questions about the behavior of LWT socionatural systems during known environmental changes, as well as major social changes in neighboring societies.

First, our understanding of LWT chronology remains imprecise. Important sites remain undated, including Nunagiak (Ford 1959), several sites near Icy Cape, the few sites from the Beaufort Sea coast that have survived coastal erosion, and many sites from the Colville and Utukok drainages. Typology suggests all of these sites were occupied during the LWT period. For many of the interior sites, particularly along the Utukok and Colville, the existence around contact of well-established trade networks which used those areas logically requires them to have been in use for an indefinite time prior to contact in order for the trade networks to have become so established; in other words, to have been used by LWT people. However, the duration of use is unclear. Resolving this requires considerable effort in radiocarbon and dendrochronological dating, and also research to develop accurate correction factors for ^{14}C dating marine mammals. At many sites, there is no suitable material of terrestrial origin for dating.

Second, we do not have a complete picture of LWT land use and settlement patterns. Many areas still lack comprehensive surveys. Until the advent of the helicopter, survey was restricted to boat or pedestrian methods. While areas accessible by such means were certainly used in the past, very likely other areas were used only when the ground was frozen and snow-covered. Further, entire river systems have only limited surveys, in some cases by nonarchaeologists (Solecki 1950), or no surveys at all. Survey bias is toward highly visible winter village sites. Obviously occupations in other seasons, as well as special purpose sites, such as hunting or fish camps, raw-material source sites, and stopping places on travel routes must have existed, but very few have been identified. This leads to the second deficiency, which is that most excavation of LWT sites has focused on winter houses, particularly their interiors, which, of course, limits the ability to understand activities that did not take place in winter houses.

Third, we do not have sufficient knowledge of raw materials sources for many materials (Rasic, this volume, chapter 5). Lithic raw materials were very likely trade items, but identified sources are few. The same is true for clays for ceramics, and such special purpose materials as amber, jet, ocher, kittik (a friable sedimentary rock used in hide

processing), and pyrites. The use of isotopic signatures and aDNA may allow animal byproducts to be traced to areas of origin as well.

Based on artifact typology, architectural styles, and recurring decorative motifs, it is clear that the LWT region was not a tightly bounded system. Thule-like elements occur as far south as Brooks River on the Upper Alaska Peninsula (Dumond 1981), and Thule peoples occupied coasts as far as Greenland and Labrador, with interior occupations developing during the middle and later part of the LWT period. Nonetheless, other cultures existed in proximity to LWT peoples, including Punuk people on St. Lawrence Island and in Chukotka, at least in the earlier part of the LWT period, with indications of Punuk direct influences on LWT people, particularly in the southern region (Mason, this volume, chapter 20). Gwii'chin people were neighbors of LWT people living on the upper Kobuk and Noatak Rivers, as well as those moving into the Brooks Range, with indications that cultural influences extended across that ethnic boundary (Burch 2005; Giddings 1952).

The methodological issues noted above are not insurmountable, but do need to be dealt with. In some cases, this will require data from other disciplines than archaeology. Many interesting questions remain to be answered. Some, such as refinements in artifact chronologies, are of interest primarily to specialists in Neoeskimo archaeology. Others may be viewed as completed experiments in coping with environmental change. These, perhaps in concert with data from other regions, can be useful data points for modern populations who face changes of similar magnitude. This may be particularly true in the Arctic, where agriculture never was introduced and many groups are still highly dependent on subsistence hunting and fishing for their livelihood.

CLIMATE CHANGE EFFECTS

The role of climate as a driver in Neoeskimo cultural change has often been seen as a given, based on its coincidence with the Little Ice Age (LIA). Without being an environmental determinist, one can acknowledge that a climate as demanding as that of the Alaskan Arctic would affect the culture of the people who live with that climate, and that changes in the climate might well lead to changes in the culture as a means of adaption. The challenge is to move beyond correlations of cultural changes and warm/cold or stormy/stable periods, to explanations that include an underlying mechanism for the effect, in a form that can be tested with archaeological data. Many scenarios have been put forth (see Mason and Gerlach 1995 for a review), but the results have been less than satisfying. In some cases, the climatic reconstructions available at the time were revised, so that changes explained by a warmer climate actually turned out to have taken place during a cooling period or vice versa.

Profound environmental changes were being experienced in this area, indeed continent-wide, during the LWT period. Although climatic and environmental

reconstructions for the LWT period in North and Northwest Alaska are still somewhat limited, with a recent Northern Hemisphere proxy-based temperature reconstruction (Christiansen and Ljungqvist 2012:767–769) being forced to eliminate all three of the published regional decadal or better proxy records that cover the LWT period from the final data set due to its failure to track the instrumental record, research is ongoing and they are improving.

Geomorphological research (Mason 1993; Mason and Gerlach 1995; Mason and Jordan 1993) indicates several periods of storminess across northwest Alaska, around A.D. 1400, 1550–1600, and 1700–1850, although data from Point Barrow suggest that storminess did not increase until after A.D. 1420, and was perhaps constant through the LIA. This suggests intraregional variation in storminess, and possibly precipitation, that affected availability and accessibility of resources species differentially, driving some of the localized differentiation seen in LWT.

RESOURCE STRESS AND RESPONSE: CLIMATE CHANGE, DEMOGRAPHIC CHANGE, OR SOMETHING ELSE?

Evidence suggests the LWT population grew throughout the period. This raises the question of whether some changes in LWT culture were responses to increased populations straining a previously adequate resource base. The question of whether the stress was real (i.e., not enough food and raw material for everyone) or perceived (i.e., people had to work harder to maintain the same level of nutrition or had to include less preferred items in their diet and choice of raw materials) remains open.

Changes in climate indubitably resulted in changes in the availability and/or accessibility of resources species at given locations (cf. Jensen 1987). This in turn could have created conditions of resource stress, which would have been more variable at some locations than others.

Some organized interpersonal conflict occurred throughout the LWT period, based on finds of slat armor and oral history, perhaps increasing through time. Such conflict can be a response to resource stress. Increased levels of violence occurred in many areas of North America around this time, often co-occurring with environmental change and extreme resource stress (Maschner 2000). Conflict can exacerbate resource stress by preventing hunters from utilizing certain territories for fear of being killed (Burch 2005), reducing the resources available to them in the absence of any environmental changes. Of course, resource stress during LWT times need not have resulted from a single cause. When and where it occurred, the specific causes might have been any or all of the issues mentioned above.

INTERIOR OCCUPATION

Almost certainly, LWT culture developed from coastal roots. The interior was occupied previously, but not by Thule people. Current data suggest that the LWT period witnessed a change in interior occupation, with the movement of small groups of Thule people into long-term settlements along the rivers and at mountain lakes.

Since the Kobuk valley differs climatologically from the rest of the region, some groups may have relocated to avoid coastal storms. Alternatively, the attraction was possibly easier access to an abundant wood supply, since the cooling climate would have increased the need for heating fuel. Residents of successful whaling villages would have had less need to move for fuel, since whales provided blubber for heating fuel. North of the Brooks Range, the interior is fuel poor.

Another suggested reason for movement into the interior is to avoid conflicts along the coast. Since the area was apparently already occupied by an ethnic group with whom there was violent conflict in the ethnohistoric period (Burch 2005), this seems a poor conflict-avoidance strategy. Certainly, some interior sites, notably the cinder cone villages of the Seward Peninsula interior (Schaaf 1995), were apparently chosen for defensibility.

Dog traction appears in the archaeological record of this area around beginning of interior settlement (VanStone 1955). The two phenomena may be linked, with interior movement being either the impetus for or a necessary precondition of developing dog traction. It is hard to imagine that people who reached Greenland from Alaska in a generation or so did so without dog traction, especially given the presence of dog sledging gear at Skraeling Island (McCullough 1989:131–135), yet others could not get up the Kobuk River. Whether the evidence for earlier dog traction has not been recovered, or it was not necessary for interior settlement is an open question. Certainly, larger teams would mean more dog-related artifacts, and would be facilitated by access to a reliable source of dog food, such as fish or whales. Until more interior sites located in other parts of the region are dated and studied in more detail, this will remain an open question.

NOTES

1. This work is ongoing, and will be published when complete.
2. Although organic preservation at most sites in Arctic Alaska is exceptional, earlier researchers generally did not retain faunal material, and often published only species lists or species counts from one or two units. Recent projects collect better zooarchaeological data.
3. The LWT toolkit closely resembles the toolkit in use when early ethnographers encountered the Iñupiat in the mid to late nineteenth century (Maguire 1988; Murdoch 1898; Nelson 1969). The reader is referred to these sources for a more detailed description of LWT/Iñupiat technology.

4. Techniques are summarized in Nelson 1969 and Giddings 1952.
5. This was true of other Neoeskimo cultures (e.g., Old Bering Sea, Punuk) that were not present in the area under discussion.

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CHAPTER 22

HOLOCENE PREHISTORY OF THE NORTHWESTERN SUBARCTIC

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THE northwestern Subarctic region of North America comprises a generally homogeneous Holocene record of human material culture, and can be treated as a culture area for the purposes of this review. The geographic area of this discussion encompasses the boreal forest interior regions of Alaska and Yukon Territory, including northern British Columbia to the edges of the Canadian Plateau. The regional record is anthropologically important for a number of reasons, including potential for examining human adaptive strategies in marginal environments, adaptive responses to major episodes of climate change, colonization of the Americas, and elucidation of Athapaskan prehistory.

The prehistory of the region remains poorly understood for various empirical and theoretical reasons. The region is sparsely populated, with development and related archaeological investigations largely constrained to road and other infrastructure corridors. The boreal forest that has dominated the region for the last ~10,000 calendar years (Bigelow and Powers 2001) has presented several problems for site recovery and material culture analyses. The acidic boreal forest soils, particularly within the last 4,000 years, generally inhibit organic preservation and are associated with lower sediment deposition rates (Dilley 1998). Radiocarbon samples from the modern soil horizons are susceptible to contamination by overlying burned forest sediments and intrusive charcoal. Deeply buried, stratified sites are comparatively rare, and difficult to locate, though recent modeling efforts in the Tanana basin have yielded encouraging results (Potter 2008b). The northwestern Subarctic is characterized by relatively lower primary productivity and resource diversity and supports lower forager population densities compared with Northwest Coast and Eskimo populations in coastal areas (Binford 2001). The majority of sites are small, surface lithic scatters, and there is little evidence of sedentary behavior (housepits, storage pits) until after ~1000 cal B.P.

Pottery and art, two categories of material culture important for social and political inferences, are rare to nonexistent throughout this region. Pottery occurs only very late in the Holocene sequence, with little evidence for diffusion of ceramics from earlier Paleoeskimo groups (e.g., Norton). Protohistoric and historic Western interior Alaskan ceramics in the lower Yukon valley (Yukon line-dot), particularly among the Koyukon and Ingalik (De Laguna 1947) were likely diffused from neighboring Eskimo groups. Rainey's Lower Tanana informants noted pottery traded from the Rampart area (Rainey 1939:376). Prehistoric art is also very rare, consisting of engraved designs on portable artifacts and pictographs (Holmes 1986).

Because of these empirical limitations, archaeologists typically rely on a few well-preserved stratified sites, widely spaced in geographic space, to develop culture histories and explore subsistence economy and technology. These sites (e.g., Onion Portage, Dry Creek, Broken Mammoth, Charlie Lake Cave; see below) tend to dominate discussions of regional prehistory, to the near exclusion of the vast majority of archaeological remains, small surface sites or buried sites with limited testing. Fladmark's (1979) review of an influential proceedings volume (*The Athapaskan Question*, edited by Helmer et al., 1977) is salient, and many researchers have stressed the limits of the data and the necessarily exploratory nature of interpretations for the northwestern Subarctic, a consideration I stress again here.

Human remains in this region are very rare, as expected for highly mobile high-latitude foragers. Late Holocene remains of a mummified body of a 18–19-year-old male, termed Kwäday Dän Ts'ínchi, were discovered in northern British Columbia, about 80 km from the coast (Beattie et al. 2000). Isotopic analyses indicate extreme reliance on marine animals for most of his life, then a shift to terrestrial or freshwater resources in the last months of life. Recently, a cremated three-year-old and two infant burials have been found at Upward Sun River, all three dating to 11,500 cal B.P. (Potter et al. 2011, 2014). Other late Holocene remains have been found (e.g., Lake Minchumina; Holmes 1986), typically in cremated contexts, consistent with the earliest known Athapaskan mortuary practices (VanStone 1974:84–85).

An important new dataset was introduced in 1997: well-preserved organic remains from alpine ice patches in the southwest Yukon (Hare et al. 2004) and Alaska (Dixon et al. 2005; VanderHoek et al. 2007). Perishable artifacts like bow, arrow, and dart parts, feathers, and moccasins have been recovered, allowing for an unprecedented view into alpine caribou-hunting behaviors and technological change. Results indicate a sharp technological transition from primarily lithic bifacial projectile points (lanceolate and notched forms) mounted in dart shafts from ~9400 to ~1300 cal B.P. to primarily antler or bone projectile points mounted in arrow shafts from ~1300 to the present (Hare et al. 2004). This break coincides roughly with the emergence of the Athapaskan tradition or Aishihik phase (Dixon 1985; Workman 1978).

This review summarizes the culture chronology, technology, subsistence, settlement patterns and site structure for the northwestern Subarctic, and then considers Athapaskan prehistory in this context.

CULTURAL CHRONOLOGY

While there remains considerable debate about the nature of the terminal Pleistocene occupations of the region (Bever 2001a; chapters in Goebel and Buvit 2011), there is less debate regarding Holocene affiliations, partially due to lack of information and perhaps less academic interest. Cultural historical sequences that are widely accepted, or at least widely used, are Workman (1978; see Hare et al. 2008) for the southwest Yukon Territory and Dixon (1985) for central Alaska. Other influential cultural chronologies include Cook and McKennan (1970), Holmes (2001), and Gotthardt (1990). Of interest is the relative homogeneity of these cultural groupings, with broad similarities from western Alaska through southwest Yukon Territory and interior northern British Columbia, particularly for early and middle Holocene assemblages. These sequences largely agree on basic traditions and chronology, but disagree on details like the presence or absence of certain technologies and the nature of transitions between the traditions. Figure 22.1 is a heuristic illustration of archaeological groupings for the northwestern Subarctic and adjacent regions. The boundaries of these groupings are debatable, and largely fall in areas with little archaeological investigation.

- (1) Terminal Pleistocene complexes without (or with) microblades include Chindadn, Nenana, Sluiceway complexes, East Beringian, and Northern Cordilleran traditions (Clark 1983; Holmes 2001; Powers and Hoffecker 1989; Rasic 2011). Chindadn and Northern Cordilleran sites extend into the early Holocene. These groups encompass wide technological and typological variability, and their relationships and general ecology are not well understood (Bever 2001a; Cook 1969; Powers and Hoffecker 1989).
- (2) Terminal Pleistocene or early Holocene complexes with microblades include Denali complex and/or American Paleoarctic tradition (Akmak, Kobuk, and Little Arm phases) (West 1967; Powers et al. 1983; Workman 1978). Associated artifacts include wedge-shaped and conoidal microblade cores, transverse and other burin forms, bipointed and lanceolate projectile points, and boulder spall artifacts. Various nonmicroblade complexes (Northern Paleoindian tradition, Mesa complex) have been posited in early Holocene interior sites (Dixon 1999; Hoffecker 2011). Important early Holocene sites include Gerstle River (Potter 2005), Dry Creek (Powers et al. 1983), Healy Lake (Cook 1969), Carlo Creek (Bowers 1980), Panguingue Creek (Powers and Maxwell 1986), and Jay Creek Ridge (Dixon et al. 1985) in Alaska; and Little John (Easton et al. 2011), Charlie Lake Cave (Driver et al. 1996), Bluefish Caves (Cinq-Mars and Morlan 1999), KaVn-2 (Heffer 2002), and Annie Lake (Hare 1995) in northwest Canada. Early to middle Holocene microblade-bearing components are geographically widespread, distributed throughout Alaska and the Yukon Territory, along the northern Northwest Coast, and southeast as far as northern Alberta (Younie et al. 2010).

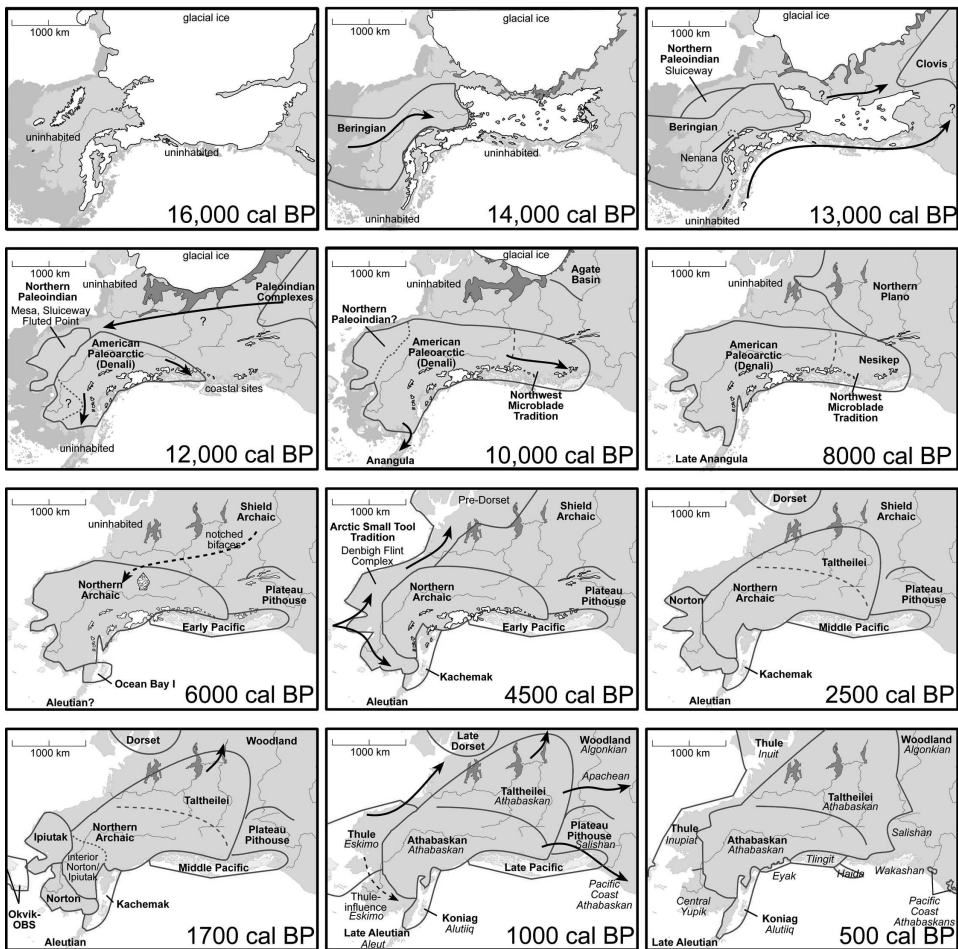


FIGURE 22.1 Tradition-level archaeological patterning in the northwest Subarctic (16,000–500 cal B.P.). Darker lines indicate boundaries between contemporary traditions. Glacial ice distributions and sea levels are derived from Dyke et al. (2003) and Manley (2002) respectively, using a digital elevation model. Map prepared with ArcGIS software, using a North Pole Azimuthal Equidistant Projection. Graphics drafted by Ben Potter.

The Mesa and Sluiceway complexes, defined largely by smaller or thinner and larger or thicker lanceolate bifacial point forms, respectively, spurred gravers (more common among Mesa assemblages), but with variable presence or absence of microblade technology, are represented by sites in the Brooks Range at ~12,000 cal B.P., though a Tuluq hearth dates to 13,000 cal B.P. (Kunz et al. 2003; Rasic 2011), and may be linked to a broader Paleoindian tradition (Bever 2001b). Hoffecker (2011) argues for Mesa-like bifaces Dry Creek Component 2 (distinct from microblade-rich areas of the component) and Moose Creek, suggesting a more widespread Paleoindian tradition presence in interior Alaska. Dixon (1999) postulated a Northern Paleoindian tradition incorporating various nonmicroblade early Holocene sites like Carlo Creek,

Houdini Creek, and Jay Creek Ridge, though others have argued for their inclusion into the Denali complex (Bowers 1980; Mason et al. 2001). These Paleoindian-related complexes may extend to about ~8000 cal B.P. in northern and interior Alaska (Bever 2001b; Rasic 2011).

- (3) The middle Holocene culture associated with notched bifaces is broadly termed the Northern Archaic tradition (Palisades, Portage, Taye Lake, and Aishihik phases), and variants include Minchumina and Brooks Range traditions and Tuktuk complex (Esdale 2008; Holmes 1986; Schoenberg 1995). Microblades have been variably assigned to this complex (Ackerman 2004; Anderson 1988; Dixon 1985; Esdale 2008; Holmes 1986; Potter 2008b; Schoenberg 1995; Workman 1978). While some have argued for a “pure” (i.e., nonmicroblade) Northern Archaic (Palisades complex) and a “mixed” Northern Archaic (with microblades) (Tuktuk complex) (Ackerman 2004; Anderson 1988; Clark 1994), recent analyses of large site samples suggest a single cultural tradition with variable presence of microblade technology (Esdale 2008; Potter 2008b). Associated artifacts include notched, stemmed, and lanceolate projectile points, large asymmetrical semilunar bifacial knives, notched cobbles (presumed net-sinkers), and wedge-shaped and tabular microblade cores. The Annie Lake complex (defined by concave-based lanceolate points) may be related to this middle Holocene group (Greer 1993; Hare 1995). The Northern Archaic is geographically distributed throughout interior regions of northwest North America as well as coastal sites in northern and northwest Alaska. Associated artifact types extend across the Northwest Territories, Canada, linked with the Taltheilei tradition (Gordon 1996) and perhaps with Pointed Mountain and Mackenzie complexes (Morrison 1987). Thus, the Northern Archaic tradition is geographically isomorphic with the preceding Denali complex/Paleoarctic tradition, except for absence of the former in southern coastal areas. There appears to be more regional variation than with the preceding traditions; variants include Palisades and Portage phases in northwest Alaska (notched and oblanceolate points respectively along with absence of microblades), Taye Lake phase in southwest Yukon (with tabular microblade cores and notched bifaces), and Julian complex in Northwest Territories (with blade cores, notched and triangular points).

Important middle Holocene components include Onion Portage (Anderson 1988), Fog Creek (Dixon et al. 1985), Butte Lake (Betts 1987), Lake Minchumina (Holmes 1986), Dry Creek (Powers et al. 1983), Ratekin (Skarland and Keim 1958), Broken Mammoth (Holmes 1996), and Healy Lake (Cook 1969) in subarctic Alaska, and Bezuya (Le Blanc and Ives 1986) and Annie Lake (Hare 1995) in northwest Canada. Related sites include Agiak Lake (Wilson and Slobodina 2007), Tuktuk-Naiuk (Esdale 2008), Putuligayuk Overlook (Lobdell 1981), Kuparak Pingo (Lobdell 1986), and Kurupa Lake (Schoenberg 1995) in north Alaska and Security Cove and Pond Site (Ackerman 2004) in southwest Alaska.

- (4) The late Holocene culture, related to northern Athapaskans, has been termed Athapaskan and Taltheilei traditions, Aishihik phase, and/or Late Prehistoric period (Cooper 2007; Dixon 1985; Shinkwin 1979; Workman 1977, 1978). Associated artifacts include diminutive bifacial Kavik or Klo-kut tanged points, cold-hammered copper points and awls, and a predominance of bone and antler hunting weapons and domestic tools. Important late Holocene components include Healy Lake Village and Garden sites (Cook 1969), Lake Minchumina (Holmes 1986), Nenana River Gorge (Plaskett 1977), Dixthada, Dakah Denin's Village (Shinkwin 1979), Ringling site (Workman 1976), Birches Site (West 1978) in Alaska and Klo-kut (Morlan 1973), Rat Indian Creek (Le Blanc 1984), KdVo-5 (MacKay 2008), and Ta'tla Mun (Thomas 2003) in northwest Canada.

Cultural historical approaches have limited explanation of key behavioral elements of early Subarctic populations (e.g., settlement systems, land-use strategies), and have resulted in inconsistencies in affiliation of specific sites to cultural constructs, particularly early Holocene nonmicroblade sites like Eroadaway, Carlo Creek, Owl Ridge Component 2, and Jay Creek Ridge (Potter 2011). Alternative strategies, focused on technological organization, behavioral, and ecological approaches, have been more common in recent years (Esdale 2008, 2009; Potter 2005, 2008a, 2008b; Rasic 2011; Wygal 2009, 2011). Potter (2008a, 2008b) held cultural affiliation constant and examined multiple technological and economic variables in 1,000-year intervals in central Alaska, and found major transitions at 6000 and 1000 cal B.P., consistent with middle and late Holocene material culture transitions (Northern Archaic and Athapaskan traditions). Esdale (2009) and Wygal (2009) found that differences in early and middle Holocene technologies related to raw-material access and position of sites within reduction sequences.

There remains fundamental disagreement about the nature of the cultural transition between the late Pleistocene and early Holocene. Some archaeologists argue for multiple cultural groupings co-occurring in central Alaska during this period (Dixon 2001; Goebel et al. 1991; Hoffecker 2011; Hoffecker et al. 1993). Other archaeologists argue for a broad technological tradition with variation due to land use and mobility patterns (Cook 1969; Holmes 2001; Potter 2011; West 1996). Current data are ambiguous, and more work on land-use modeling, site structure and organization, geochemical lithic sourcing, and technological organization are needed to test competing explanations.

The cultural transition between early Holocene and middle Holocene traditions is also not well understood. The Northern Archaic tradition may represent (1) a migration of populations, perhaps adapted to and associated with the expanding boreal forest (Anderson 1988; Workman 1978; but see Mason and Bigelow 2008); (2) amalgamation of new and existing Subarctic populations (Dumond 1987); and/or (3) diffusion of new technologies and tool types with limited or no population replacement (Clark 1994; Morrison 1987; see also discussion by Clark and Gotthardt 1990). The "Late Denali complex" was proposed to account for late Holocene microblades (Dixon 1985). Subsequent research shows a continuous occurrence of this technology throughout the Holocene

in interior Alaska (Potter 2008b), suggesting Northern Archaic sites with and without microblade or burin technology extend from ~6000 to ~1000 cal B.P. Magne and Fedje (2007) show long sequences of microblade technology in northwest Canada, arguing for correspondence of microblades and Na-Dene speakers (see below).

The last major cultural transition before the arrival of Europeans or Euroamericans occurred at ~1300–800 cal B.P. This period is associated with a dramatic decrease in formal flaked stone technology (including the loss of microblades), a concomitant increase in organic tools, the first appearance of copper, and the appearance of widespread villages, summer fishing camps, and seasonal storage sites (Dixon 1985; Shinkwin 1979). Because of this clear technological break (Holmes 1986; Shinkwin 1977; Workman 1977), continuity (or lack thereof) between Northern Archaic and Athapaskan traditions is difficult to establish. However, the extensive late-prehistoric records at Healy Lake, Klokut, Lake Minchumina, and sites in the southwest Yukon have suggested local continuity of Athapaskan-speaking populations (Cook 1969, 1989; Holmes 1986; Morlan 1973; Thomas 2003; Workman 1978).

Three models for this transition have been posited by Potter (2008a): technological and economic change among existing populations, population replacement, and taphonomic bias, with most of the evidence supporting the first model; essentially a lowland-bison hunting system collapsed following the introduction of bow-and-arrow technology, leading to a shift to increased salmon and caribou procurement and the importance of stored foods overwinter. This resulted in a reduction of mobility and access to high-quality toolstone, increased reliance on locally available organic implements, and increased importance of trading networks for other resources (e.g., copper).

TECHNOLOGIES AND TYPOLOGIES

Detailed technological analyses of western Subarctic sites tend to be site-based, and relatively few sites have produced large formal tool assemblages to allow robust typological frameworks to be established. Existing typological schemas tend to be based on morphology (Anderson 1988; Powers et al. 1983; West 1967; Workman 1978), and are sometimes not consistently applied (compare Chapter 4 and Appendix A of Powers et al. 1983; see also Gotthardt 1990; Hare 1995). Many flaked implement classes (e.g., pieces esquilles, endscrapers, burins) have received relatively little analytical attention. Bifacial projectile points, a hallmark of Paleoindian and Archaic studies in North America, have received considerable regional attention (e.g., Rasic 2011), but little widespread agreement in application (see chapters in Carlson and Magne 2008). Lanceolate forms are found throughout the record and no systematic study has been attempted to compare or define early and later prehistoric forms. Mesa-type bifaces, largely limited to the Brooks Range early Holocene (Bever 2001a), have been reported at Spein Mountain, southwest Alaska (Ackerman 2001), and possibly Dry Creek and Moose Creek (Hoffecker 2011), suggesting an overlap with Denali complex materials in subarctic Alaska.

Notched bifaces (with varied morphologies, which may represent knives as well as projectile points, but see Rasic and Slobodina 2008) are considered a diagnostic of the Northern Archaic tradition. They appear over much of Alaska and southwest Yukon after 6000 cal B.P., though three shallowly buried sites in the Brooks Range may have earlier associated dates (Esdale 2009). Notched forms vary considerably, and no comprehensive typological analysis has been completed on large multisite samples to date to elucidate function(s), subgroupings, level of resharpening, and recycling. Several notched forms were identified as dart points associated with caribou-hunting areas in alpine ice patches, and none have been found associated with bow-and-arrow technology (Hare et al. 2004).

The late Holocene Kavik points (along with unilaterally barbed bone and antler arrowheads) have been used to define Late Prehistoric complexes associated with northern Athapaskans. These points are widespread geographically in northwest North America with some local variability, including Klo-Kut and Aishihik phases (Le Blanc 1984; Workman 1978) and Kavik complex (Campbell 1968) (see also Magne and Matson 2008). Most associated assemblages conformably fit within the Athapaskan tradition (Dixon 1985).

Typological approaches (in research orientation and methods) still predominate the literature, but analyses from technological organization perspectives have become more common (Esdale 2009; Goebel and Buvit 2011; Potter 2005; Rasic 2011), and some (Potter, Rasic) have suggested that within constrained regions (e.g., Tanana valley, Noatak valley), substantial technological variability exists in the context of single prehistoric cultural systems. This type of behavioral flexibility is consistent with findings from Paleoindian contexts in central North America.

Microblade technology, used as insets into composite implements, is widespread in the region, but with decreasing occurrence in the eastern and southern periphery (e.g., central British Columbia and the MacKenzie basin (Ives 2008; Morrison 1987)). Microblades are common in the early Holocene, but become much less common by the middle Holocene in south-central and northwest Alaska and the Canadian western Subarctic; however, they persist until about 800 cal B.P. in central Alaska (Potter 2008b). The organic components of microblade-inset armatures have been found at only six sites in this region: Trail Creek Cave 2 (Larsen 1968), Lime Hills Cave 1, Ilnuk (Ackerman 2011), Gladstone Ice Patch (Hare et al. 2004), Rice Ridge (Steffian et al. 2002), and Gerstle River. The fragmentary data and more complete forms from Siberia suggest large dimension (over 10 cm long, ~1 cm wide), thus elongate points. Basal treatment on some of these items suggests hafting to a shaft. While some have argued that composite forms functioned as arrow points, saws, or knives (Ackerman 1996; Yi and Clark 1985), the clear appearance of bow-and-arrow technology only 1,300 years ago suggests dart or spear point function(s) (Hare et al. 2004). Composite and bifacial points co-occur in most of the cultural traditions in the western Subarctic, including the Denali complex and Northern Archaic tradition. Potter (2005, 2008a) has argued that bifacial and composite points represent distinct co-occurring weapons technologies, relating to season of use, prey species, habitat selection, and/or to dart versus spear functions. Rasic and Slobodina (2008) argue that lanceolate points, notched points, and composite points

functioned as spear tips, dart tips, and arrow tips respectively. Further experimental research is needed to rigorously test these hypotheses.

There remains much ambiguity regarding tool stylistic and functional variation, and this remains a much-needed area of research. Without detailed typological studies of large samples from multiple sites, this ambiguity is likely to persist. Extant early and middle Holocene sites contain a wide variety of formal bifacial and unifacial tools, including end- and sidescrapers (made on flake and blade blanks), convergent scrapers, transverse and dihedral burins, and other flake tools. Bifacial forms include lanceolate, triangular, spatulate, and notched knives and points with concave, straight, and convex bases. Microblade cores include wedge-shaped forms, generally made on flakes, as well as conical or subconical varieties. Boulder spall artifacts (termed “tci-thos”) have been found throughout the early to late Holocene record.

Middle Holocene artifact types generally show a continuity with earlier periods, including lanceolate point forms, end- and sidescrapers, burins, and flake tools, but new forms are found, including notched bifaces (discussed above), notched cobbles, interpreted to be net sinkers (Anderson 1988), and large asymmetrical bifacial knives (Dixon 1985). Microblade technology persists, including continuity of wedge-shaped microblade cores rejuvenated through core tablet removal, in good contexts at Broken Mammoth and Tok Terrace Northeast (Holmes 1996). Tabular microblade core forms are limited to the middle or late Holocene, providing a rare temporal diagnostic. The addition of notched cobbles is suggestive of increased fishing (or at least net fishing) (Anderson 1988; Workman 1978), though harpoons or barbed points remain rare to absent in most interior assemblages, even during periods where they are ubiquitous in adjacent coastal regions.

During the late Holocene, larger bifacial projectile points are replaced (in part) by diminutive “Kavik” stemmed points, but mostly by barbed and unbarbed antler or bone arrow-points (Shinkwin 1979). Other late Holocene flaked stone tool types include wedges (*pièces esquillées*), endscrapers, and expedient boulder spall artifacts (Workman 1977). Organic industries are underrepresented in the earlier record due to generally poor preservation in the region, and many late Holocene assemblages include bone or antler awls, beamers, scrapers, knives, and drinking tubes, as well as birch bark used for trays and cache pit liners. While formal flaked stone industries were unknown to recent central Alaskan Athapaskans (McKenna 1959), most late Holocene material culture is linked with historic Athapaskans (Shinkwin 1979).

Current debates center on how these archaeological cultures organized technology with respect to subsistence economy, access to raw materials, and seasonal mobility strategies (see chapters in Goebel and Buvit 2011). Linkages in organization between archaeological cultures have been found, mirroring the conservatism in certain technologies (e.g., microblades, burins, boulder spall artifacts). Wygal (2009) further found that Denali complex technological organization was similar from the terminal Pleistocene to the middle Holocene; Potter (2011) found similar landscape use and technological organization patterns between pre- and post-Younger Dryas assemblages, but major changes between early and middle Holocene assemblages; and Esdale (2009)

found that Northern Archaic technological organization was internally varied, but not substantially different during its temporal span.

Major unresolved questions relate to use of technology in specific contexts, the role of raw-material availability and accessibility in conjunction with mobility strategies in conditioning lithic assemblage variability, gender divisions of labor and contexts of tool use, the emergence and relative importance of storage through time, and the relative nature and intensity of nutritional stress through time, and strategies of risk minimization practiced by these ancient populations, and adaptive strategies used by foragers to accommodate major environmental changes from the late Pleistocene to the recent period.

SUBSISTENCE ECONOMY

Faunal remains are rarely encountered in modern boreal forest sediments due to acidic soils, and many analyses have focused on a few well-preserved site-based assemblages (Ketz 1982; Potter 2007; Yesner 1996). Late Pleistocene or early Holocene sites with excellent faunal preservation include Broken Mammoth (Yesner 1996), Mead (Potter et al. 2013), and Little John (Easton et al. 2011), in the Tanana River basin. These assemblages show a wide range of resources, including large and small mammals, birds (primarily waterfowl), and fish. Pleistocene megafauna (excluding bison and wapiti) do not appear in archaeological assemblages, except possibly horse at Swan Point (Holmes 2011) and mostly curated mammoth ivory at Swan Point, Broken Mammoth, Mead (Dilley 1998), and Gerstle River (Potter 2005), though some specimens from the first two sites date to the occupation (Holmes 2011). Fauna from the Upward Sun River site show a narrower focus on small mammals, birds, and fish remains (Potter et al. 2011). For the Denali complex, Mason et al. (2001) suggested reliance on caribou, though intersite analyses indicated reliance on bison and wapiti (Potter 2008b). Denali complex components at Gerstle River indicate specialized hunting strategies, containing multiple individuals of adult bison and wapiti; analyses indicate primary processing onsite, consumption of marrow, and removal of high meat-yield portions for transport to a residential base camp (Potter 2007). Additional terminal Pleistocene and early Holocene evidence of bison exploitation is found at Mead Cultural Zones 3, 4, and 5 (Potter et al. 2013), Teklanika West components 1 and 2 (Coffman and Potter 2011) and Charlie Lake Cave (Driver et al. 1996).

Detailed subsistence analyses are hampered by small sample sizes and the dearth of detailed faunal analyses (economic utility, taphonomy, mortality profiles, etc.) on assemblages in the region. Potter (2008a) examined a sample of 84 faunal assemblages for central Alaska. A broad range of taxa including birds, fish, and small mammals (particularly hare and beaver) were consistently found from the late Pleistocene to the late Holocene. Among large ungulates, a dichotomous signal was observed: bison and wapiti dominated early Holocene assemblages until ~6000 cal B.P., when caribou dominated the record (increasing from ~20 percent of early Holocene faunal-bearing assemblages to almost 70 percent of middle (Northern Archaic) and late Holocene (Athapaskan)

assemblages. Technologies were differentially associated with specific environments and taxa: bifacial points were positively associated with caribou and sheep, particularly notched points; caribou in upland contexts; while microblade technology (composite points) was positively associated with bison, wapiti, and moose in lowland contexts. Thus, a dichotomy of upland small ungulates and bifacial points, and lowland large ungulates and composite points is represented by the data, and this relationship does not change from the early to middle Holocene. Holmes and Bacon (1982) suggested that microblade persistence in central Alaska may be related to bison hunting, and this link has been strengthened by these technological associations (Potter 2008a) and later work on Holocene bison distributions (Stephenson et al. 2001).

The continuity of most animal resources even though periods of dramatic climate and vegetational change (e.g., Younger Dryas, Holocene Thermal Maximum, and expansion of the boreal forest) is interesting and not well understood (Potter 2011; see also Graf and Bigelow 2011). The clearest transition in subsistence economy was between early and middle Holocene, when bison became much less common and wapiti disappeared. Bison and wapiti persist in the southwest Yukon, with ice-patch finds dating to 2900 and 1400 cal B.P. (Hare et al. 2004). Bison and wapiti are not found in late Holocene sites like Healy Lake, Lake Minchumina, Dixthada, Dakah-Denin's Village, Nenana River Gorge, Klo-kut, Rat Indian site, and Ta'tla Mun, which are dominated generally by caribou, beaver, and hare, fish, and birds (Cook 1969; Holmes 1986; Le Blanc 1984; Morlan 1973; Plaskett 1977; Shinkwin 1979; Thomas 2003). Moose apparently did not play a major economic role (Yesner 1989). Late Holocene and historic upland sites include caribou, Dall sheep, black bear, and marmot (Ketiz 1982; Plaskett 1977). At Ta'tla Mun, central Yukon, large faunal datasets ($n = 2755$, 1227 number of identified specimens) for components below and above the eastern lobe of the White River Ash (~1140 cal B.P.) indicate substantially similar subsistence economies (Thomas 2003).

In terms of overall characterization of western Subarctic prehistoric subsistence economies, broad-spectrum foraging of large, medium, and small mammals, waterfowl and terrestrial birds, and anadromous and nonanadromous fish appears commonly throughout the record (e.g., Broken Mammoth, Mead, Upward Sun River, Little John, Ta'tla Mun). At the same time, some sites have evidence of logistically organized specialized big-game hunting activities (e.g., Dry Creek, Gerstle River) (Potter 2007; Powers et al. 1983). The organization of economic activities allowing for both strategies in certain contexts remains unclear.

SETTLEMENT PATTERNS AND SITE STRUCTURE

Intersite variability studies are in their infancy in this region, partly due to the relative lack of investigation and systematic coverage. Site function remains largely elusive

given the problems inherent in most Subarctic contexts inhibiting the recovery of organic artifacts, fauna, and features (e.g., acidic soils), and many inferences of site activities are derived from lithic analyses. The most common site structural elements in the region are outdoor hearths; these are typically used to infer temporary or spike camps (Guthrie 1983). Site structure varies, with residential structures (semisubterranean houses) present at Upward Sun River and at several sites dating to after 1300 cal B.P. (Shinkwin 1979), tent rings inferred to represent temporary tent structures recovered at Agiak Lake, dating to the middle Holocene (Wilson and Rasic 2008), and cache pits widespread after 1300 cal B.P. (Arndt 1977). The shift from (apparently) rare habitation sites or residential base camps to widespread villages near clear-water streams and food storage coincides with the technological transition between the Northern Archaic and Athapaskan traditions. While these patterns could indicate much higher residential mobility during earlier periods, the discovery of the Upward Sun River structure suggests sampling bias. Athapaskan tradition house pits and cache pits are typically visible from the surface, while the Upward Sun River site find is not. The apparent disparity between early and middle Holocene versus late Holocene residential mobility could also be explained by shifts in residential locations from the middle to late Holocene.

Early prehistoric settlement system models have been proposed by Guthrie (1983:268–273), Potter (2008b), and Wygal (2009). Guthrie (1983) posited a system of base or residential camps (unknown at the time of Guthrie's writing) and associated hunting "spike" camps (e.g., Dry Creek). Potter (2008b) posited a system of upland land use in the summer (targeting sheep and caribou) and lowland land use in fall, winter, and spring (targeting bison, wapiti, waterfowl, small game, and fish). Residential base camps (Upward Sun River C3, Mead CZ3) and temporary hunting camps (e.g., Dry Creek, Gerstle River) were almost certainly linked (see discussion in Potter et al. 2011), with logistically organized hunting parties and local foraging groups operating within a complex subsistence-settlement system. Given general technological and economic similarities from the early to middle Holocene, this type of system could extend to later periods. The role (and degree) of storage in this hypothetical system remains unknown. Expectations for residential base camps (e.g., high diversity and number of tool types, high number of lithic raw-material types, location relative to a wide range of resources; see Binford 1980) may be found at sites like Healy Lake Village, Garden, and Lake Minchumina (Cook 1969; Holmes 1986); and these may represent another class of residential sites.

Overall, the data indicate very high residential mobility for the period from 14,000 to ~1000 cal B.P. Logistical mobility varied, but widespread storage and heavy salmon exploitation is evident only after ~1000 cal B.P. for this region. The continuity in technology throughout the Holocene and similar broad-spectrum subsistence strategies appear strikingly conservative, and suggest flexible, resilient cultural adaptations to the early parkland and later black-spruce-dominated boreal forests of the northwest Subarctic.

ATHAPASKAN PREHISTORY

The prospect of attempting to link ancient languages or proto-languages with recurring sets of material culture is daunting if not impossible (cf. Renfrew 2000). A number of proposed linkages may be consistent with the data but difficult to test; data in this region tend to be coarse-grained, limited to supposed stylistic attributes of lithic technology. Recently, Dumond (2010), Ives (2010), and Potter (2010) summarized and evaluated Na-Dene prehistory in the context of Vajda's (2010) linguistic connection between Na-Dene (Athapaskan-Eyak-Tlingit) and Yeniseian languages. Potter (2010) focused on patterns of material culture continuity and discontinuity, identifying contemporaneous archaeological groups with separate material culture traditions, and evaluating antiquity of language groups from the present (direct historical approach). Dumond, Ives, and Potter agreed that evidence for migration and discontinuities was present in the northeast Asian and northwest North American record at 14,000–12,000 cal B.P. (initial colonization), 6000–4800 cal B.P., and 1000 cal B.P. It is plausible that Na-Dene ancestors migrated to North America as part of late Pleistocene or middle Holocene population expansions from northeast Asia, but a specific material cultural correlate with Na-Dene speakers is unclear. Microblade technology, argued by a number of researchers to be associated with Na-Dene or Athapaskan ancestors (Borden 1968; Dumond 1969; Matson and Magne 2007), is ubiquitous across northeast Asia, including Japan and northern China, while it is generally more isomorphic with Na-Dene speakers in northern North America.

Early attempts to isolate Athapaskan-specific identity markers in material culture, such as Kavik points, have had equivocal results (Helmer 1977; Workman 1977). Matson and Magne (2007) analyzed projectile-point stylistic variability to demarcate Athapaskan and Salishan-speaking populations in British Columbia. Matson and Magne (2007) provide a detailed model for later Athapaskan migrations (after 1200 cal B.P.), with the White River Ash eastern lobe pushing Athapaskan populations east and south (following Derry 1975), leading to recent Pacific, Washington, and Apachean Athapaskan distributions. Ives's (2008) review of this model is largely supportive, but is critical of the use of lexicostatistics and oral histories, and the notable lack of language-material culture correlates, particularly in the south and east. (e.g., lack of microblades and Kavik points).

Several researchers posit local continuity of specific language groups that extend beyond 2000 cal B.P. (Figure 22.1), perhaps inconsistent with lexicostatistical approaches estimating the Na-Dene time-depth of ~3500 years (see discussion by Kari and Potter 2010). Canadian Shield Archaic and later Woodland groups, dating after ~6000 cal B.P., have been linked with Algonquian speakers by Wright (1981). The non-Salishan Nesikep tradition was replaced by Plateau Pithouse tradition associated with Salishan speakers at ~5700 cal B.P. according to Strydom and Rousseau (1996). Wakashan-Salishan distinctions have been identified along the Northwest Coast

at ~1800 cal B.P. (Hobler 1990), and Salishan has been linked with Marpole (to 2400 cal B.P.) and possibly Locarno Beach (to 3500 cal B.P.) phases (Matson and Coupland 1994; Mitchell 1990). Arctic Small Tool tradition (ASTt) or Norton tradition has been linked with proto-Eskimo-Aleut speakers (Dumond 1987) or possibly Na-Dene speakers (Dumond 2010). Dumond (1984) linked Kachemak tradition (~4000 cal B.P.) with Eskimo-related groups. For Na-Dene speakers, Gordon (1996) has linked with Taltheilei tradition with Canadian Athapaskans (2900–200 cal B.P.), and Moss et al. (1989) have identified Tlingit settlement patterns on Admiralty Island to 1500 cal B.P. Matson and Magne (2007) suggest Pacific Coast and Apachean Athapaskan movements at ~1000–800 cal B.P. In general, Potter (2010) summarized a number of regional sequences along the northern Pacific Rim from ~3800 to 6000 cal B.P. that extend into the historic period and have been linked by archaeologists to specific language groups. These data suggest Na-Dene prehistory likely extends beyond the ~1000 cal B.P. Athapaskan tradition (*sensu* Dixon 1985) and may perhaps be associated with the Northern Archaic material culture tradition (Workman 1978).

Scott and O'Rourke (2010) reviewed biological data on northeast Asian and northwest North American population affiliation and found no genetic link between Na-Dene and Yeniseian populations, which are more closely affiliated with their respective neighboring groups. Genetic evidence from ancient human remains in the late Pleistocene and early Holocene is sparse, represented at only two sites in northwest North America, Upward Sun River and On-Your-Knees Cave (Potter et al. 2011, 2014; Kemp et al. 2007). Of these, only On-Your-Knees Cave has yielded DNA—which is not closely affiliated with any northern group, including Na-Dene, but is related to groups throughout Pacific coastal North and South America (Kemp et al. 2007). Ancient mtDNA from middle Holocene Paleoeskimo contexts (ASTt) are from haplogroup D2a1 (Gilbert et al. 2008; Hayes et al. 2005; Rasmussen et al. 2010), which is very distinct from Na-Dene (fixed or nearly fixed for haplogroup A) (Scott and O'Rourke 2010), suggesting ASTt and related groups (Choris, possibly Norton and Ipiutak) are not ancestral to Na-Dene-speaking populations.

Two apparent cultural boundary zones are established by the middle Holocene, one between Northern Archaic and Shield Archaic at the southeastern edge of the western boreal forest, and between Northern Archaic and Paleoeskimo (ASTt, Norton, Ipiutak) in northwest and western coastal regions and interior Alaska. While there were some fluctuations in these boundaries, for instance Norton or Ipiutak components in western Alaskan subarctic areas, at Hahanudan and Lake Minchumina (Clark 1977; Holmes 1986), they were remarkably stable for thousands of years, suggesting they marked distinct social boundaries. The middle and late Holocene records for these areas are quite distinct, and each area had internally similar but externally dissimilar sets of material cultural traits (including the presence or absence of pottery) and basic subsistence economies (ASTt, Choris, Norton, Ipiutak, the later Northern Maritime tradition in the Bering Strait region and Kachemak in south-central Alaska; Northern Archaic—Athapaskan or Taltheilei tradition in the western Subarctic, and Shield Archaic—Woodland in the central Subarctic).

All of these data, perhaps ambiguous when considered in isolation, suggest a pattern of deeper antiquity of Na-Dene populations in northwest North America. Kari (2010) provides linguistic arguments for geographic conservatism, slow rates of language change, and deep antiquity for Athapaskan languages within the western Subarctic. However, the nature of the northwestern Subarctic archaeological record on this point is just as ambiguous as to questions relating to technology, settlement, and social organization discussed above. Recent efforts on a number of fronts suggest that some of these questions may be resolved with integrated multidisciplinary research in the coming years.

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CHAPTER 23

THE PRECONTACT HISTORY OF SUBARCTIC NORTHWEST CANADA

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INTRODUCTION

FOR archaeologists seeking to move beyond culture-historical interpretations of the past to an understanding of the subsistence and land-use strategies of precontact hunter-gatherer societies, the Subarctic archaeological record presents a unique set of challenges and opportunities. Well-preserved faunal remains are rare in Subarctic archaeological contexts, making it difficult to interpret past subsistence practices, and poor preservation of the organic components of toolkits often hinders efforts to understand the breadth of activities that took place at most sites (Le Blanc 2009). In addition, surface and near-surface archaeological contexts are common in the Subarctic, leading to palimpsests that are often difficult to disentangle into behaviorally relevant units. At the same time, archaeological sites in surface contexts are often highly visible, facilitating the compilation of large regional datasets for reconstructing past land-use patterns, and archaeological sites preserved in frozen contexts offer important glimpses of the organic elements of material culture and well-preserved faunal assemblages (e.g., Hare et al. 2004; Morlan 1973). In addition, ethnoarchaeological research in recent decades has led to increasingly sophisticated understandings of Aboriginal cultural geographies, providing data relevant for interpreting historic and late precontact land-use patterns (e.g., Stewart et al. 2004).

In this chapter we provide an overview of what archaeologists have learned about the diverse subsistence and land-use strategies developed by hunter-gatherer societies living in Subarctic northwest Canada—from the earliest traces of human presence in this region to the historic period. Figure 23.1 shows the archaeological sites and geographic features discussed in this chapter.



FIGURE 23.1 Archaeological sites and geographic features mentioned in the text. (1) Qugyuk Site; (2) Tsiigehtchic Bison; (3) Rat Indian Creek; (4) Klo-Kut; (5) Dechyoo Njik; (6) Bluefish Caves; (7) Swan Point; (8) Little John Site and KaVn-2; (9) Chimi Site; (10) Yukon Ice Patches; (11) NWT Ice Patches; (12) Julian Site; (13) Aberdeen Site; (14) Peace Point Site. Map by Amy Barker and Julie Buysse, Prince of Wales Northern Heritage Centre, Government of the Northwest Territories.

EARLY TRACES OF HUMAN PRESENCE IN NORTHWEST CANADA

In this section we review current perspectives on the earliest inhabitants of northwest Canada—when they arrived, where they came from, and how they made a living in the varied late glacial and early Holocene landscapes of this region. We limit the scope of our discussion to paleoenvironmental and archaeological data spanning the period ca. 12.5 ka to 7 ka B.P.¹ but recognize that possible artifacts from the Old Crow Basin and Bluefish Caves in northern Yukon Territory may indicate human occupation of northwest Canada during full glacial times (see Morlan 2003 for a review of these data).

The late glacial landscape of northwest North America presented a diverse and rapidly changing environment to human inhabitants. The unglaciated regions of Alaska and Yukon Territory—eastern Beringia—were undergoing dramatic environmental change, with the steppe-tundra that dominated the cold and dry conditions of the full glacial environment giving way to mesic shrub-tundra (Guthrie 2006; Hoffecker and Elias 2007). Significant changes to large mammal communities in eastern Beringia paralleled this shift, including the extinction of mammoths and horses, the resurgence of steppe bison, and invasion of wapiti and moose (Guthrie 2006). The archaeological record of eastern Beringia reflects this shifting landscape. Cultural Zone 4 (CZ 4) of the Swan Point site in central Alaska represents the oldest definitive human occupation of eastern Beringia, with 11 radiocarbon dates providing an age range of ca. 12.4–11.8 ka B.P. (Holmes 2011). Holmes relates the microblade and burin technology found at CZ 4 to the Dyuktai culture of western Beringia. The small faunal assemblage from this level includes horse teeth and mammoth teeth and tusk fragments, as well as evidence of grouse or ptarmigan and waterfowl. Radiocarbon dates on several teeth and tusk fragments indicate that these specimens overlap in age with charcoal and residue (carbonized fat and grease) samples taken from hearths in CZ 4, suggesting that humans coexisted with mammoth and horse in eastern Beringia, and perhaps hunted these species (Holmes 2011). In contrast, the archaeological complexes that appear in central Alaska after Swan Point CZ 4 seem to represent adaptations to an emerging shrub-tundra environment, with subsistence economies focused on bison, wapiti, birds, and small mammals (Hoffecker and Elias 2007). These complexes include the closely related Nenana and Chindadn complexes, which, taken together, date ca. 11.3–10 ka B.P., and the Denali complex, which first appears ca. 10.6 ka B.P. and persists—in contrast to the previous two complexes—into the Holocene (Holmes 2011; Potter 2008b). In a similar timeframe (ca. 10.5–10 ka B.P.), Mesa complex components appear in northern and southwest Alaska (Hoffecker and Elias 2007).

In the Mackenzie Valley, retreat of the Laurentide ice sheet (LIS) from its maximum position along the Richardson and Mackenzie Mountains and the retreat of montane glaciers in the Mackenzie Mountains opened the northern portion of an ice-free corridor (IFC) that linked eastern Beringia to unglaciated areas south of the continental ice sheets

(Dyke 2004). While the timing of this event continues to be unclear, recent evidence indicates that the IFC may have been physically open as early as 12–11.5 ka B.P. (Dyke 2004). Current thinking on the IFC draws an important distinction between the physical and “ecological” opening of the corridor (Wilson 1996:97), with recent estimates of 11.5 ka B.P. (Mandryk et al. 2001) and 11 ka B.P. (Arnold 2002) for the establishment of a corridor with sufficient biotic resources to support human populations. Wilson (1996) suggests that the dispersal of bison may be a useful proxy for the ecological opening of the corridor due to the relative abundance of bison fossils in this area. New data from a steppe bison (*Bison priscus*) fossil found at the mouth of the Arctic Red River in the lower Mackenzie Valley indicate that the northern portal to the IFC was occupied by bison as early as 11.8 ka B.P. (Zazula et al. 2009), and Shapiro et al. (2004)—using ancient DNA techniques—show that fossils representing a southward dispersal of Beringian bison through the northern end of the IFC appear in the Peace River area of northeast British Columbia from 11.2–10.2 ka B.P. Southern bison that dispersed north into the IFC are found in this area at 10.5 ka B.P., and were present in southern Alberta by 11.3 ka B.P. (Shapiro et al. 2004; Wilson et al. 2008). These data indicate that large tracts of the IFC were able to support bison populations by ca. 11.2 ka B.P., and that the corridor was certainly open in an ecological sense by 10.5 ka B.P. In contrast, the region to the east of the Mackenzie Valley, which today includes the vast area of the taiga shield, remained buried beneath the LIS. Deglaciation of this area was not complete until after 8 ka B.P. (Dyke 2004).

These emerging landscapes set the stage for human dispersal across northwest Canada, where the earliest evidence of human presence in this region is found in unglaciated Yukon Territory. These finds are best understood in the context of the archaeological record of eastern Beringia. Early material from the Bluefish Caves in northern Yukon includes a small lithic assemblage consisting of microblade and burin technologies similar to those of the Denali complex, and a large collection of Pleistocene fauna, including examples of flaked and fractured bones and possible bone tools that span the period 24–12 ka B.P. (Morlan 2003), although it remains controversial whether or not the bone modifications are the result of human activities or other processes (e.g., Dixon 1999). The lithic assemblage is not directly dated but is thought to predate 10.5 ka B.P. (Morlan 2003). The Little John Site in southwest Yukon offers additional evidence of early human occupation of eastern Beringia. Easton et al. (2011) report a date of 12 ka B.P. for a bison vertebra found in association with a small collection of lithic debitage, possible hammerstones, and other faunal remains in the basal component of the Little John Site. While further excavation and additional dates are needed to confirm that this is a cultural occupation, the single radiocarbon age overlaps with the age range established for Swan Point CZ 4 (Holmes 2011). A paleosol complex containing stone tools in association with a large faunal assemblage overlies this level at the Little John Site. Five dates on bone collagen indicate an age range of 10–8.9 ka B.P. for this component, which has been provisionally assigned to the Denali complex based on the attributes of the lithic technology (Easton et al. 2011). Similar to early Holocene adaptations in central Alaska, the abundant faunal remains from the paleosol complex are dominated by bison (Yesner et al. 2011). Caribou and hare were of secondary importance, but the

presence of other large and small mammals and bird remains in lesser amounts indicate that a broad set of resources were exploited during this period. A possible Chindadn or Nenana complex component is also present at Little John but has proven difficult to date as it was found in a shallow sedimentary context in a different area of the site. The lower component of archaeological site KaVn-2—located 55 km southeast of the Little John Site and containing a small assemblage of stone tools bracketed by radiocarbon ages of 10.7 ka and 10.1 ka B.P.—offers further evidence of early human occupation of southwest Yukon (Heffner 2002).

Current perspectives on the role of the IFC in early human movements suggest that peoples of the Paleoindian tradition moved northward through the IFC during the Younger Dryas chronozone, which dates ca. 12.8–11.7 ka calendar years before present (cal B.P.; Graf and Bigelow 2011). While archaeological evidence of this event is lacking in the northern portion of the IFC, the appearance of the Mesa complex—characterized by lanceolate points with close similarities to Paleoindian tradition assemblages—in northern and southeast Alaska at ca. 10.5–10 ka B.P. may provide indirect evidence for this migration (Hoffecker and Elias 2007).

The taiga shield to the east of the Mackenzie Valley was first inhabited between 8 ka and 7 ka B.P. by the Northern Plano tradition, which is thought to represent the northward movement of bison-hunting peoples derived from the Agate Basin complex of the Great Plains, who shifted their adaptation to caribou hunting (Gordon 1996; Wright 1972).

REGIONAL HISTORIES: 7 KA B.P. TO THE HISTORIC PERIOD

In this section we review regional culture histories and hunter-gatherer land use between 7 ka B.P. and the beginning of the historic period. As caribou were hunted by most hunter-gatherer societies during this period, we use caribou-hunting strategies as a theme for exploring the various subsistence economies practiced in this region. The caribou that live in northwest Canada can be divided into three “ecotypes” based on their habitat and ecological adaptations—migratory tundra, northern mountain, and boreal forest (Hummel and Ray 2008)—and Subarctic hunter-gatherers invented tactics for hunting each of them. Figure 23.2 shows the distribution of the caribou ecotypes in northwest Canada.

Migratory Tundra Caribou

Migratory tundra caribou are found in a near-continuous distribution across the northern transitional forest-tundra zone of northwest Canada (Hummel and Ray 2008). Most

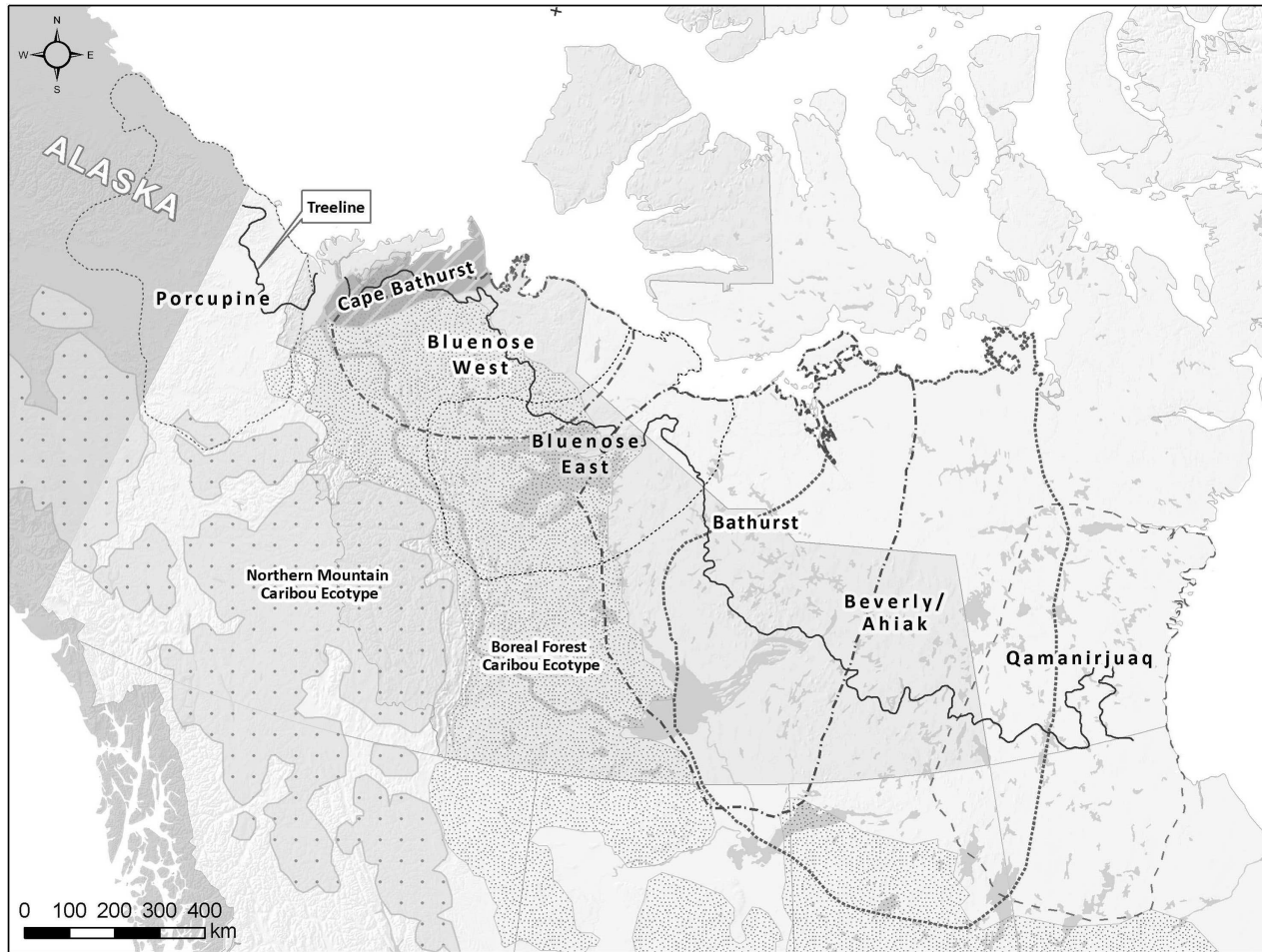


FIGURE 23.2 Distribution of caribou ecotypes in mainland northwest Canada (herd distributions adapted from Hummel and Ray 2008). The named ranges are migratory tundra caribou herds (only herds that winter in the boreal forest are shown). Map by Amy Barker and Julie Buysse, Prince of Wales Northern Heritage Centre, Government of the Northwest Territories.

migratory tundra herds spend the winter dispersed in the boreal forest. In the spring, the caribou assemble in large groups and travel hundreds of kilometers to traditional calving grounds on the Arctic tundra. It is not uncommon for caribou to migrate in groups that number hundreds or thousands of animals during the snow-free months. Migratory tundra caribou tend to move south toward the tree line throughout the summer, and return to their winter ranges in the boreal forest in the fall.

In this section we compare and contrast the migratory tundra caribou-hunting peoples of northwest Canada. There are several common features across space and time. First, it seems almost certain that migratory tundra caribou were a focal resource for all of the edge-of-the-woods hunter-gatherer societies that developed in northwest Canada. This resource was unmatched in its capacity to provide significant quantities of meat and raw materials. Ethnographic data indicate that hunting tactics were oriented toward killing large numbers of animals at a time, especially during the annual migrations, when the caribou were concentrated in large herds and their movements were predictable (Gordon 1996; Smith 1978). Continuity in hunting tactics between the ethnographic and archaeological records suggests that this was also the case in the deeper past. Communal hunting tactics were the most effective means of making large harvests, and two techniques in particular seem to have common expression in the ethnographic and archaeological records of northwest Canada. Caribou-hunting sites are often found at traditional water crossings, where narrows in rivers and lakes funneled the movements of caribou during their annual migrations, and hunters could spear numerous animals from canoes or kayaks, or shoot them as they emerged from the water. Large, multicomponent archaeological sites are often found at water crossings, indicating that these places were reliable hunting locations over long time spans (Gordon 1996; Le Blanc 1984; Morlan 1973; Wright 1972). Ethnohistoric and ethnographic descriptions of Athapaskan caribou hunters suggest that the use of drift fence and impoundment facilities built from logs and brush was also a widespread communal hunting method (Figure 23.3). Examples of historic fences are known from northwest Canada, but it is difficult to assess the time depth of this technology, as these features degrade quickly in the Subarctic environment (Clark 1987; McFee 1981). Andrews and Zoe (1997) were able to work around this problem by drawing on the oral tradition of Dogrib elders to locate several areas where drift fences were built on lake ice to intercept the northward migration of the Bathurst caribou herd. While the fences themselves disappeared with the spring thaw, the presence of lookout sites, campsites, and processing areas with precontact components is consistent with the operation of fences at these locations over long time spans.

While the hunting techniques used by the caribou-hunting peoples of northwest Canada may have been broadly similar, the ways that caribou hunters organized their land use were probably more diverse. Subarctic archaeologists have used different approaches to reconstruct the settlement patterns of edge-of-the-woods hunter-gatherers—each tailored to the nature of the archaeological data available in different areas. Gordon (1996) took advantage of the high visibility of archaeological sites in the Thelon and Dubawnt basins to compile a dataset consisting of over 1000 sites in the annual range of the Beverly caribou herd. The vast majority of these sites are found in



FIGURE 23.3 Historic caribou fence from the Northwest Territories. Photograph by Thomas D. Andrews, Prince of Wales Northern Heritage Centre, Government of the Northwest Territories.

surface or near-surface contexts along major waterways in the Beverly Range. The principal strength of this dataset is its geographic scope—it includes sites from the boreal forest, tree line, and tundra areas of the Beverly Range, while the only significant gap seems to be poor representation of sites located away from major waterways (see Friesen 2004). The principal weaknesses of this dataset are common to surface sites in Subarctic contexts: faunal remains are exceedingly rare, complex palimpsests are prevalent in surface sites with multiple components, and most sites lack scientific dates. Gordon (1996) was able to partially control for these problems by excavating several deeply stratified sites in the Thelon and Dubawnt drainages. Gordon used radiocarbon dates from these contexts to establish a general temporal framework for the culture-historical sequence of the Beverly Range, and the artifact assemblages from these sites helped him to assign surface assemblages to cultural phases.

This large dataset of archaeological sites establishes that all of the precontact cultural phases in the archaeological record of the Beverly Range are represented in archaeological sites in forest and tundra contexts, leading Gordon (1996) to propose a stable pattern of long-distance seasonal movement between the forest and tundra. Gordon characterizes this cultural adaptation as “herd following,” suggesting that hunter-gatherer bands practiced a pattern of high residential mobility in order to intercept caribou on both their summer and winter ranges in a manner essentially similar to that of the “Caribou-Eater” Chipewyan described in the ethnographic and ethnohistoric records (Smith

1978). Like the Chipewyan, Gordon (1996) suggests that precontact hunter-gatherers dispersed during the winter to hunt small groups of caribou in the boreal forest and assembled in larger groups for communal hunts on the tundra and the tundra-forest transition during the annual migrations.

General trends in site and assemblage characteristics support this land-use model (Gordon 1996). Site features are limited to traces of mobile architecture (i.e., tent rings), and cache features (indicative of longer-term occupation) are rare or absent. Camps on the tundra and near the tree line tend to be located near to caribou-hunting locations, particularly caribou crossing sites. Consistent with expectations for a residential base, stone tool assemblages tend to represent a broad range of activities, indicating that butchering and hide-processing activities were undertaken close to kill sites, and in the few site contexts where faunal remains are sufficiently well preserved to permit analysis, most elements are present, indicating that caribou carcasses were not transported great distances from kill sites. These data support a settlement pattern in which highly mobile populations moved frequently between caribou-hunting locations throughout their seasonal rounds.

While this settlement pattern may have existed throughout much of the precontact history of the Beverly Range, it was crosscut by some dramatic culture-historical events. In fact, Arctic cultures moved into the Beverly Range on at least two occasions in the 8,000-year archaeological record of this region. The first event took place from ca. 3.5 to 2.7 ka B.P., when hunters of the Pre-Dorset tradition took up "herd following," penetrating as far south as the forests of northern Alberta and Saskatchewan in the winter (Gordon 1996). The fine tools of the Pre-Dorset tradition—including, for example, microblades, burins, and small end- and sideblades that may have been used in harpoon technology—represent a dramatic technological departure from the Subarctic cultures that came before and after them in the Beverly Range, although they may have served similar overall functions (Gordon 1996). Northern Plano hunters, described briefly above, gave rise to the Shield Archaic tradition (6.5–3.5 ka B.P.), which preceded the Pre-Dorset tradition on the Beverly Range. The main presence of Shield Archaic hunters in this area coincides with a period of climatic warming in the central Subarctic, which ended at ca. 3.5 ka B.P., when the onset of a period of cooling resulted in the rapid retreat of the tree line to the south (Moser and Macdonald 1990). The push and pull factors that led to the movement of Pre-Dorset hunters onto the Beverly Range at this time are unclear. Changing sea-ice conditions in coastal environments during this period may have reduced the success of sea-mammal harvests, leading them to seek a more stable resource base in the interior (McGhee 1996). Whatever the reasons, this southward incursion from the Arctic was widespread in northwest Canada (e.g., Clark 1987; Noble 1971; Pilon 1994).

The second event took place in the historic period, when the Caribou Inuit began to move inland from their traditional use area on the west coast of Hudson Bay to hunt caribou at tundra water crossings in the Beverly and Qamanirjuaq ranges (Smith and Burch 1979). In fact, by the mid-1800s, the Caribou Inuit economy was almost entirely focused on interior resources (Smith and Burch 1979). This transition was made

possible by the decreased use of tundra areas by some Chipewyan hunter-gatherers in the late eighteenth and early nineteenth centuries due to the impacts of epidemics and increasing fur-trade opportunities to the south (Smith and Burch 1979). The roots of the Chipewyan are thought to lay in the precontact Taltheilei tradition, which first appears in the Beverly Range at ca. 2.7 ka B.P.—after the disappearance of the Pre-Dorset tradition (Gordon 1996). Perhaps the most compelling evidence for this relationship is that the known distribution of Taltheilei sites seems to approximate fairly closely the traditional use areas of the Chipewyan and closely related Yellowknives Dene (Gordon 1996; Noble 1971).

Caribou Inuit land-use patterns contrast in several important ways with the herd-following model practiced by the Chipewyan. Living on the tundra for the entire seasonal round, the Caribou Inuit were less mobile than the herd-following cultures. An important corollary of this was that the Caribou Inuit depended on large stores of caribou meat—harvested during the fall migration—to survive the winter (Friesen 2004). This land-use strategy is reflected in the archaeological record. Archaeological sites containing remnants of cold-adapted architecture (i.e., qarmat), and warm-season architecture (i.e., tent rings) in roughly equal proportions indicate multiseasonal use of these locations, which are typically located near caribou-hunting locations (Friesen 2004). Abundant cache features found in Caribou Inuit sites provide material evidence of the essential role of storage in their settlement pattern.

While Subarctic archaeologists have made progress in understanding land-use strategies in the Beverly Range, the picture of precontact life in this area is not complete. We know next to nothing about the procurement of secondary resources, such as fish, muskox, small mammals, and birds, or how these procurement strategies fit into these land-use patterns (see Friesen and Stewart 2004 for a counterexample). In addition, fitting archaeological data into the dominant herd-following pattern may mask variations in settlement strategies that occurred in the past. For example, there are some data to suggest that there were times when precontact cultures stayed longer on the tundra into the cold-season than would be predicted by the herd-following model—perhaps in a manner more similar to the Caribou Inuit settlement pattern (Dawson et al. 2010). New data from the Maguse Lake region in the adjacent Qamanirjuaq Range demonstrate that hunters of the middle phase of the Taltheilei tradition (ca. 1.8 ka–1.3 ka B.P.) built cold-adapted semisubterranean houses near a tundra caribou crossing site in this area (Dawson et al. 2010). In a similar manner, Wright (1972) recorded a semisubterranean house feature with an entrance passage at the Aberdeen Lake site, which he attributed to a late phase of the Shield Archaic tradition (although the date of ca. 3 ka B.P. for this structure must be viewed with some caution, as it was obtained from the peat matrix of the structure).

The gap in our understanding of the procurement of secondary resources is largely a function of the poor organic preservation that is pervasive in the archaeological record of this region. The archaeological record of edge-of-the-woods hunter-gatherers in the Porcupine Range of the northern Yukon stands in contrast to the Beverly Range record, with several archaeological sites in permafrost contexts providing fine-grained data on

subsistence adaptations, but a far smaller database of sites for reconstructing overall settlement patterns. Particularly abundant assemblages derive from the Klo-kut and Rat Indian Creek village sites located at caribou crossings on the middle Porcupine River. Le Blanc (1984) separates the late precontact culture-historical sequence of the middle Porcupine River into two phases: the Old Chief phase (ca. 2.8–1.2 ka B.P.) and the Klo-kut phase (ca. 1.3 or 1.2 ka B.P. to the early historic period), which may be ancestral to the Gwich'in Athapaskans of the Old Crow Basin (Morlan 1973).

While the faunal assemblages from the Rat Indian Creek and Klo-kut sites are dominated by caribou, both sites provide information on the secondary resources procured by the site inhabitants (Le Blanc 1984; Morlan 1973:Table 73). For example, caribou comprises 98.1 percent of the identified specimens at Rat Indian Creek, with moose, hare, beaver, and muskrat each making up less than 1 percent of the assemblage (Le Blanc 1984:43). The presence of fetal caribou bones in every level of the Klo-kut site indicates that this site relates to the spring caribou hunt, when pregnant cows were moving north toward their calving grounds. Well-preserved organic tool assemblages from the Klo-kut phase provide further information about the breadth of activities that took place at these sites. Le Blanc (2009:535) provides a summary of the bone and antler technologies of the Klo-kut phase, which include artifacts such as arrowheads for fish, bird, and large mammals, lance-heads, fishing equipment, such as composite hooks and leister barbs, and hide-working equipment, such as fleshers, beamers, and awls.

Artifact and faunal assemblages from these sites provide a detailed view of spring hunting activities on the middle Porcupine River (although some levels of Rat Indian Creek indicate occupation during other seasons as well), but tell us less about the overall seasonal round. As relatively few sites have been excavated in the Porcupine Range, our understanding of Klo-kut phase settlement patterns is based largely on ethnographic observations of Gwich'in hunter-gatherers. These data suggest that winters were spent hunting caribou on their winter range to the south of the Porcupine River, and the fall was spent around the northern rim of the Old Crow Flats, where caribou fence facilities were used to intercept the fall migration of the Porcupine herd (Fafard 2001; Morlan 1973). Unlike the Chipewyan, who spent the summer pursuing caribou north of the tree line, the Gwich'in seem to have spent the summer months harvesting fish, small game, and waterfowl in the Old Crow Flats. Dechyoo Njik, a Klo-kut phase archaeological site in the Old Crow Flats, indicates this may also have been the case in the past. This site is interpreted as a summer harvesting location, with faunal remains dominated by fish, migratory waterfowl, and muskrats (Fafard 2001).

Northern Mountain Caribou

Northern mountain caribou are found in the western Northwest Territories (NWT) and southern and central Yukon. In the spring, mountain caribou migrate from lower-elevation winter ranges to calving grounds and summer habitat located above the tree line in the alpine tundra (Hummel and Ray 2008). In some cases, winter and summer

ranges can be more than 100 km apart, resulting in large spring and fall migrations over significant distances, while other herds are relatively sedentary, migrating much shorter distances between the forested valleys of their winter ranges and their summer habitat (Kuhn et al. 2010).

Up until recent times, mountain caribou were perhaps one of the more important large mammal resources for the Athapaskan peoples living in the mountainous regions of northwest Canada. While Athapaskans are often characterized as moose hunters (cf. Yesner 1989), oral histories from southern Yukon indicate that moose became abundant in this area only toward the end of the nineteenth century, and that caribou were far more abundant before this time (e.g., McClellan 2001). It is interesting to note that as recently as the 1930s, the winter range of the Fortymile caribou herd, a northern mountain herd whose range is now restricted to central Alaska, extended across the southern Yukon as far as Whitehorse (Boertje and Gardner 2000). At this time, the Fortymile herd consisted of almost 600,000 animals, suggesting the possibility that large annual migrations may have traversed this area in the past. Until recently, very little archaeological data was available to evaluate the use of northern mountain caribou in the deeper past. One example is the Chimi site at the north end of Aishihik Lake, where a small faunal assemblage indicates that caribou were hunted near this location from ca. 2.9 ka B.P. until sometime after the southern Yukon was blanketed with tephra from the White River volcanic eruption at ca. 1.2 ka B.P. (Robinson 2001; Workman 1978).

Recent work at alpine ice patches offers new data for assessing the use of northern mountain caribou in past economies. Alpine ice patches are permanent ice bodies that form on north-facing slopes at high elevation in the northern mountains. Caribou seek relief from warm summer temperatures and insect harassment on ice patches, which, in turn, preserve a long-term record of this relationship in the form of fecal matter frozen in the ice. Well-preserved artifacts and faunal remains collected from ice patches demonstrate that they were predictable locations for precontact hunters to intercept and harvest mountain caribou, sheep, and other resources—a practice that appears to have been quite widespread in the mountains of northwest North America (Andrews et al. 2012; Hare et al. 2004, 2012; VanderHoek et al. 2012). The vast majority of ice-patch artifacts relate to throwing-dart and bow-and-arrow technologies used for hunting large mammals, which is reflected in the faunal assemblage from southern Yukon ice patches, where 78.2 percent of all elements were either caribou (54.1 percent) or sheep (24.1 percent; Hare et al. 2012). Evidence of ground-squirrel snare technology from ice patches in Alaska and the NWT indicate that harvesting activities may have been more diverse at some sites (Andrews et al. 2012; VanderHoek et al. 2012). The preservation of ice-patch artifacts is unprecedented in Subarctic archaeological contexts. Even the most fragile organic components of hunting weapons, including wood, sinew, and feathers, are preserved in the ice (Figure 23.4).

These artifacts are offering new perspectives on the culture history of northwest Canada, particularly in southwest Yukon, where a dataset of over 100 dated artifacts spans most of the Holocene (ca. 8.4 ka B.P. to the historic period), and includes artifacts related to all of the mid to late Holocene cultural phases recognized for this region,

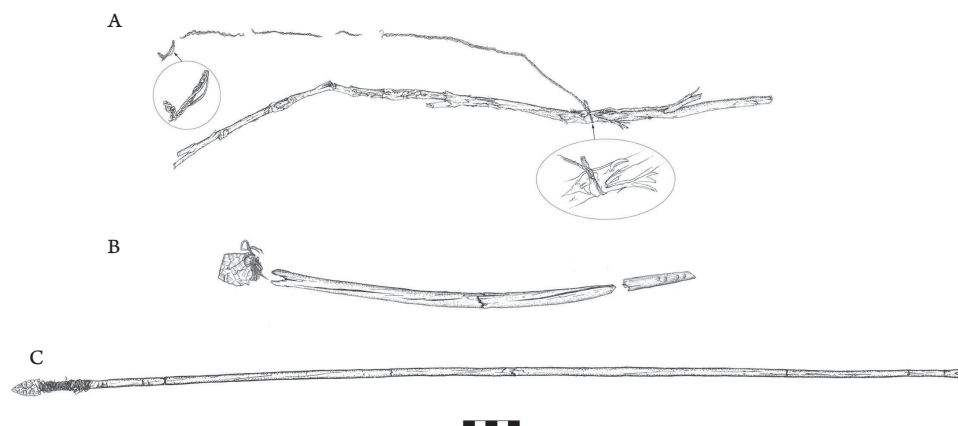


FIGURE 23.4 Artifacts collected from ice patches in the Selwyn Mountains, Northwest Territories: (a) ground squirrel snare; (b) dart foreshaft and shaft fragment; (c) arrow. Illustration by Rae Braden, Prince of Wales Northern Heritage Centre, Government of the Northwest Territories

including the Little Arm, Taye Lake, Aishihik, and Bennett phases (after Workman 1978). An antler artifact slotted for microblade insertion—dated to ca. 7.3 ka B.P. (Hare et al. 2004)—represents the Little Arm phase, which is characterized by microblade and burin technologies similar to the Denali complex of interior Alaska. This artifact slightly predates the earliest dated Little Arm components in the southwest Yukon, which span a period of ca. 7.2–5 ka B.P. (Clark and Gotthardt 1999). Hare et al.’s (2012) analysis of the distribution of ice-patch artifacts over time indicates that the numbers of dated artifacts appear to peak at 4 ka B.P. and again after 1 ka B.P. They suggest that these patterns may correlate to changes in the intensity of ice-patch hunting over time. The first peak overlaps with the Taye Lake phase of the Northern Archaic tradition, which dates between 5 and 1.2 ka B.P. in the southwest Yukon. The artifact assemblage at this time is dominated by throwing darts tipped with large stone points, including a wide variety of notched, stemmed, and lanceolate forms. The second peak in dated artifacts overlaps with the Aishihik phase, which dates between 1.2 ka B.P. and the historic period, and consists primarily of arrows with barbed bone or antler points, although other types of arrow are also present (see Alix et al. 2012). Finally, an artifact from the historic Bennett phase consists of a musket ball found at an ice patch (Hare et al. 2012).

The technological shift to bone and antler projectile points in the ice-patch artifact assemblage parallels a general trend in the Aishihik phase toward increased use of bone, antler, and native copper for tool manufacture and a simpler lithic technology relative to the preceding Taye Lake phase. This technological shift is widespread in the northwest Subarctic after ca. 1.2 ka B.P. (e.g., Le Blanc 1984; Shinkwin 1979). An important insight of ice-patch research in southern Yukon is that the abrupt transition from throwing dart to bow-and-arrow technology in Yukon ice patches is coincident with the White River volcanic eruption (Hare et al. 2004, 2012). While the ecological impacts of this event are not

known in detail, a genetic analysis of ancient DNA from caribou bones collected from ice patches indicates a partial replacement of caribou herds in the southwest Yukon after 1.2 ka B.P. (Kuhn et al. 2010). The human population movements set in motion by the ash fall that led to this technological replacement are unclear, but Workman (1974) suggests that movement of peoples to the peripheries of the affected zone likely led to intensified cultural contacts at a regional scale, which may have facilitated in part the seemingly rapid and widespread adoption of bow and arrow technology and other innovations in the northwest Subarctic after 1.2 ka B.P..

The emerging archaeological record of alpine ice patches is also offering new insights into hunter-gatherer subsistence and land-use patterns. Most importantly, it establishes the role of high alpine areas in precontact subsistence economies in northwest Canada (Hare et al. 2012). While ice patches provide a long-term record of seasonal caribou and sheep hunting in southwest Yukon, and there are apparent peaks in the intensity of ice-patch use over time, it is difficult to estimate how important these activities were to subsistence economies in the region in the absence of more detailed information on other parts of the seasonal round. Caribou hunting on ice patches most likely fit into broader-spectrum summer subsistence strategies (Andrews et al. 2012; Hare et al. 2004). In southwest Yukon, ice patches with archaeological evidence of human use tend to be located within 10 km of fish lakes with evidence of precontact use (Hare et al. 2004). These areas offered access to freshwater fish, berries, small game, and probably other large mammals like wapiti (elk), bison, and moose. Bison may have been of particular importance to precontact economies in the region. Bison bones are represented in the faunal collections of several archaeological sites in south and central Yukon, including some ice patches, and range in age from ca. 7.5 kya until after the deposition of the White River ash at ca. 1.2 kya (Hare et al. 2012; Stephenson et al. 2001:Table 1). Large mammals (including mountain caribou) were probably hunted throughout the year in this region, but emphasis may have shifted toward other resources for some hunter-gatherer societies over time. Hammer's (2002) analysis of data on site type, cultural affiliation or site age, and site distribution for archaeological sites in central Yukon indicates a trend over time toward increased settlement along the Yukon River, which likely reflects a growing importance of salmon in the seasonal round. This is particularly evident after 1.2 ka B.P., with the appearance of larger camps along the river and the mouths of its tributaries. Hammer (2002) suggests that this trend may also reflect increased emphasis on hunting caribou at river crossings during their annual migrations (i.e., the large Fortymile northern mountain caribou herd).

Boreal Forest Caribou

Boreal forest caribou are found in the Mackenzie Valley and adjacent areas in northwest Canada. In contrast to the other caribou ecotypes, they spend all year in the boreal forest, are relatively sedentary, and seldom congregate in large groups, and thus hunting tactics were likely focused on stalking small groups of animals.

Direct evidence of precontact use of boreal forest caribou is virtually absent in the Mackenzie Valley, but this reflects the fact that the archaeological record of the Mackenzie Valley continues to be one of the poorest known in all of North America (cf. Morrison 1987). As a case in point, Morrison's (1987) synthesis of the Middle Prehistoric period (ca. 6–2 ka B.P.) of this region was based on only seven excavated components, of which he considered none to be particularly well dated. In fact, radiocarbon dates are available for only four of these components, and while multiple dates are available for three Middle Prehistoric components in the Fisherman Lake area, all seem to exhibit an intractable degree of internal inconsistency (Morrison 1987:Table 1). Despite these problems, Morrison (1987) was able to demonstrate that these components—taken together—exhibit an important pattern, most notably the copresence of microblade technology and notched projectile points, which led him to place them in the Northwest Microblade tradition. Since Morrison's (1987) synthesis, very few dated components have been added to the Middle Prehistoric dataset that expands on this pattern. One example is the Qugyuk site in the eastern Mackenzie Delta, which contains a Northwest Microblade tradition component. While this assemblage does not contain notched points, microblade and burin technologies indicative of this tradition are present, as is a lanceolate projectile point. Importantly, this site also contains a faunal assemblage. While number of identified specimens (NISP) data are not available, the assemblage is dominated by caribou, but also contains waterfowl and a small amount of moose. The Qugyuk site may represent the activities of interior peoples who travelled to the Arctic coast to harvest seasonally abundant resources (e.g., migratory tundra caribou) during the spring and/or summer months (Le Blanc 1994). Dating of this component is slightly problematic in that it appears to have been mixed with a smaller Arctic Small Tool tradition component by intensive cryoturbation. Five dates on caribou bone span ca. 4.3–3.9 ka B.P. Le Blanc (1994) suggests that the earliest date of ca. 4.3 ka B.P. may apply to the Northwest Microblade component.

The Northwest Microblade tradition was originally proposed by MacNeish (1964) to account for the apparent association of notched points and microblade technology in mid-Holocene components throughout the northwest. MacNeish (1964) interpreted this pattern through a culture-historical lens, suggesting that processes of diffusion and migration had led to an amalgamation of these traits. The Northwest Microblade tradition lost steam as the concept of the Northern Archaic tradition became entrenched in the northwest (e.g., Anderson 1968). This tradition is based on the proposition that peoples bearing notched points were culturally distinct from the microblade cultures that had preceded them, and for this reason was defined in part by the absence of microblade technology. For example, Workman (1978) suggested that the transition from the microblade-bearing Little Arm phase to the notched point-bearing Taye Lake phase in southwest Yukon likely represented a population replacement.

Yet, recent large-scale syntheses of archaeological site data for interior Alaska suggest that the concept of the Northwest Microblade tradition was not such a bad idea. Potter's (2008a, 2008b) analysis of a large sample of dated components from central Alaska demonstrates continuity in the presence of microblade technology in this region from its

earliest occupation to ca. 1000 cal B.P. For the period in which notched points are present (5800–300 cal B.P.), 12 of 25 dated components also contain microblade technology (Potter 2008b:98). At a broader regional scale, Esdale (2008:Table3) demonstrates that microblade technology is present in 71 out of 187 Northern Archaic sites with notched point assemblages in Alaska and Yukon. Of a subset of 32 notched point sites from this database that are considered to have the clearest artifact associations and most reliable radiocarbon dates, 15 contain microblade technology. There is also mounting evidence that microblade technology persisted beyond the Little Arm phase in southwest Yukon (Clark and Gotthardt 1999; Thomas 2003).

Emphasis is shifting away from understanding the association of these technologies in terms of culture-historical processes to a consideration of their mutual roles in adaptive systems. Potter's (2008a, 2008b) systematic studies of interassemblage variability in central Alaska show that notched points and microblade technologies are differentially associated with different prey species during the mid-Holocene (ca. 6000–1000 cal B.P.), with microblades more likely to be associated with larger mammals, such as bison, wapiti, and moose, and notched points with caribou. Potter (2008a, 2008b) posits that different weapon systems were used for different prey species, which accounts for patterns in the presence or absence of these technologies in different sites. For example, microblade technology is more likely to be found in sites in lowland settings (Potter 2008a, 2008b). While there is obviously too little data to evaluate the evidence of similar patterns in the Mackenzie Valley, it is interesting to note that bison are present in this region during the mid to late Holocene (Stephenson et al. 2001). In fact, one specimen dated to ca. 4.8 ka B.P. was collected at the Julian site at Fisherman Lake, which contains a Middle Prehistoric component, and a bison bone dating to ca. 5.2 ka B.P. was found very close to the Qugyuk site, although its relationship to the Northwest Microblade component is unclear (Le Blanc 1994; Stephenson et al. 2001:Table 1). It may be the case that different weapon systems were used for different prey species in this region as well but more detailed data on assemblage variability is needed to evaluate this hypothesis. Similar patterns may also emerge in southwest Yukon.

Late precontact (after ca. 1.2 ka B.P.) sites in the Mackenzie Valley are more abundant than in the Middle Prehistoric period (Morrison 1984). These sites tend to be located along the Mackenzie River or at small fish lakes in the surrounding areas (Morrison 1984). The appearance of barbed bone and antler and small side-notched stone projectile points suggests that the introduction of bow and arrow technology is a hallmark of this period (Morrison 1984). Ethnographic information indicates that subsistence economies in the valley itself centered on moose, boreal forest caribou, small game, fish, and birds (Morrison 1984), although ethnohistoric (e.g., Lamb 1970) and oral historical (e.g., Heine et al. 2007) data suggest that the Athapaskan peoples living along the lower Mackenzie River also traveled out of the valley to hunt migratory tundra caribou. To the south, the deeply stratified Peace Point site, which contains 18 distinct occupation surfaces dating between ca. 2.2 ka B.P. and the historic period, offers evidence of a broad-spectrum subsistence economy (especially in the upper levels) similar to that of the Mackenzie Valley, while also adding bison and elk (Stevenson 1986). This pattern

continues into the contact period, which is marked by an increase in trade goods and a higher incidence of furbearing species in faunal collections.

CONCLUSION

While this chapter has attempted to outline some of the ways that hunter-gatherer societies made their livings in Subarctic northwest Canada, the main conclusion to be drawn from this review is that we have barely scratched the surface in this region. This is clearly reflected in the large expanses of space and time covered by the complexes, phases, and traditions that comprise regional culture histories described above, and the similarly broad-brush view of precontact subsistence and land-use strategies. While Subarctic archaeologists have found innovative ways to interpret an often impoverished archaeological record, new research is needed to reveal the true diversity of hunter-gatherer life in northwest Canada.

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NOTE

1. Unless otherwise noted, the dates in this paper are uncorrected and rounded to the nearest 100 years.

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CHAPTER 24

DEVELOPMENT OF MACKENZIE INUIT CULTURE

CHARLES ARNOLD

INTRODUCTION

WHEN foreigners first traveled into the western regions of the Canadian Arctic near the beginning of the nineteenth century, they encountered highly territorial groups of people living at the mouth of the Mackenzie River and for considerable distances along adjacent coasts. Émile Petitot, a Roman Catholic priest who made several trips to the area the 1860s, observed, “Thus the Esquimaux in question, who, to the number of two thousand souls, inhabit the shores of the Arctic Glacial Sea, between Cape Bathurst and Colville River, give themselves the specific name Tchiglit” (Petitot 1878 [1876]: 404, translated). Tchiglit, or Siglit as it is spelled today, is likely a misrepresentation of *salliq*, an Inuvialuktun term that means “closest to shore” (Felix 1996). Their descendants, who today call themselves Inuvialuit, commonly use the term “Coastal People” when speaking of the ancestral population. In keeping with established academic practice, the term “Mackenzie Inuit” is used here to refer to historically known Siglit and to their direct ancestors.

Only a limited amount of information about the Mackenzie Inuit is available in written accounts from the first half of the nineteenth century, primarily due to hostilities they exhibited toward the foreigners who first entered their territory. Peaceful interactions increased after about 1850, initially in the south as fur traders spread along the Mackenzie River valley, and later on the Arctic coast as American whalers extended their operations into the eastern Beaufort Sea. However, these increased contacts brought diseases from which the Mackenzie Inuit had no natural immunities, resulting in rapid and drastic reductions in the local populations. Among the few accounts of Mackenzie Inuit that were written during the brief window between the opening up of the area to Euroamericans and the full onslaught of disruptive forces that accompanied them are the writings of the aforementioned Father Émile Petitot (1981 [1887], 1878 [1876]), British adventurer Hugh Lowther (Krech 1989), and Anglican Church

missionary Isaac O. Stringer (Friesen 2004). Although their accounts contain important information about traditional Mackenzie Inuit culture, none of these authors were trained anthropologists, and their observations were strongly influenced by their individual and cultural biases and perspectives.

Local oral histories of the Mackenzie Inuit were also affected by these events. By the beginning of the twentieth century, the area had witnessed a large-scale demographic restructuring as Alaskan Iñupiat immigrated to the area and intermingled with the surviving Mackenzie Inuit. When Vilhjálmur Stefánsson (1919) undertook the first anthropological investigations in the area beginning in 1906, he found even then that local narrative histories and memories of traditional ways of life were attenuated. There still exists a rich oral history in the area today, but it pertains mainly to people, events, and ways of life from relatively recent times, while the earlier era of traditional Mackenzie Inuit culture is remembered largely in myth and legend (see, for instance, Alunik et al. 2003).

The archaeological record of the Mackenzie Inuit also has been eroded, but in a more literal sense. The postglacial isostatic adjustment throughout the Beaufort Sea–Mackenzie Delta area involves ongoing subsidence, resulting in a rise in relative sea level and submergence of coastlines and the disappearance of the archaeological remains of an untold number of camps and villages that once were situated along shores of the Beaufort Sea and its bays and inlets. Fortunately, due to other geological processes, archaeological sites that have survived often are deeply buried in the ground, where permafrost has contributed to excellent preservation of archaeological remains.

Eye-witness accounts of traditional Mackenzie Inuit culture written by the first foreigners in the area, together with oral histories that survived the ensuing cultural disruptions, reveal that the Mackenzie Inuit were loosely organized into several named groups, each centered on and taking their name from a main winter village (Figure 24.1). These same sources hint at a rich, complex hunting-gathering culture that was shared by these eponymous groups (Smith 1984). Similarities were evident in customs and material culture, and in a settlement pattern that included residence during the depths of winter in semisubterranean log-framed sod houses clustered in communities where people returned year after year. They may also have shared a distinctive dialect of the Inuit language, referred to as Siglit Inuvialuktun, or Siglitun (Lowe 2001). Exploring the nature of these regional groups, their interactions and their development over time have been major themes underlying most of the archaeological research that has been undertaken in the Mackenzie Inuit area.

HISTORY OF ARCHAEOLOGICAL RESEARCH IN THE MACKENZIE INUIT AREA

The earliest archaeological investigations in the Mackenzie Inuit area were excavations carried out in 1911 by Vilhjálmur Stefánsson at Franklin Bay (Morrison 1990; Stefánsson

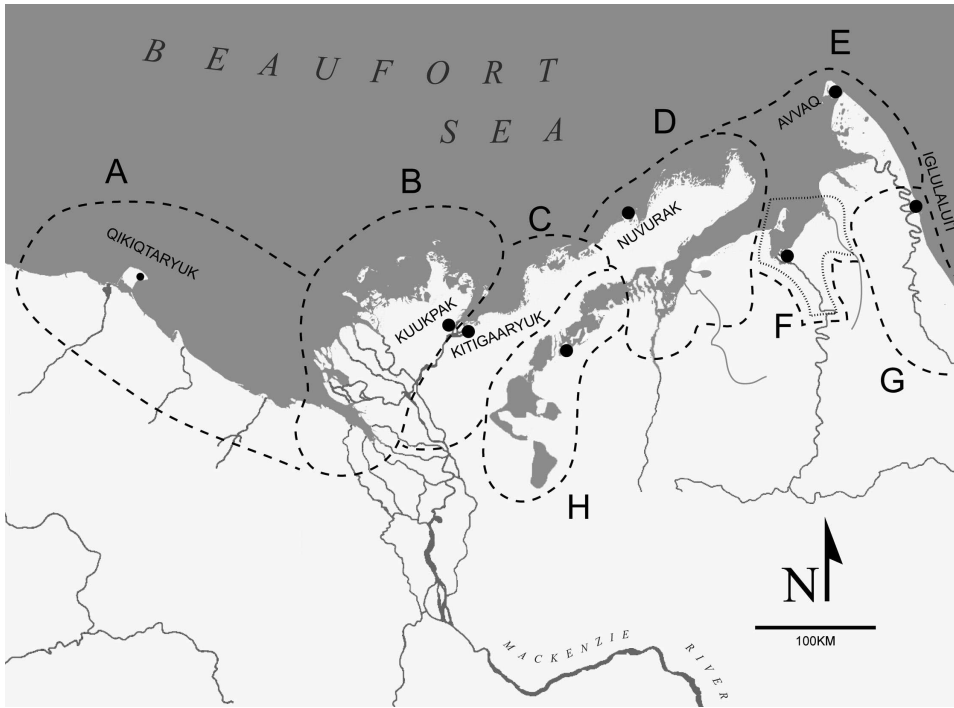


FIGURE 24.1 Mackenzie Inuit socioterritorial groups and main winter villages in the 1800s. (A) Qikiqtaryungmiut; (B) Kuukpangmiut; (C) Kitigaaryungmiut; (D) Nuvugarmiut; (E) Avvarmiut; (F) Anderson River People; (G) Igluyuaryungmiut; (H) Imaryungmiut.

Map prepared by Matthew Walls

1919; Wissler 1919), and in 1914 by Diamond Jenness at Barter Island (Jenness 1990). In 1930, Therkel Mathiassen (1930) described archaeological artifacts that had been purchased by Knud Rasmussen during his travels through the area in the mid-1920s while engaged in the Fifth Thule Expedition. Archaeological surveys in the 1950s by Douglas Osborne (1952) and by Richard MacNeish (1956) added further information, although like the earlier research theirs was exploratory in nature.

The first systematic archaeological research in the Mackenzie Inuit region was undertaken by Robert McGhee at sites near the mouth of the Mackenzie River. In his seminal book, *Beluga Hunters: An Archaeological Reconstruction of the History and Culture of the Mackenzie Delta Kittegaryumiut*, McGhee (1974) proposed an artifact typology and presented well-reasoned interpretations of subsistence, material culture, origins, and connections to one of the historically known Mackenzie Inuit regional groups.

A later phase of archaeological work was motivated by erosion at coastal archaeological sites, including Brian Yorga's (1980) excavations on Herschel Island, and the Prince of Wales Northern Heritage Centre's rescue archaeology program in the Kangmallit Bay area in the 1980s (Arnold 1988). The latter program overlapped and was integrated with a joint federal, Northwest Territories, and Yukon government program of archaeological

site survey and assessment in the Beaufort Sea region, funded through the Northern Oil and Gas Action Plan (NOGAP). Under the auspices of NOGAP, numerous archaeological sites were located, and in some cases excavated (Cinq-Mars and Pilon 1991; Pilon 1994). Although not primarily research-oriented, the two projects stimulated a surge in archaeological fieldwork and scholarship that was more analytical and problem-oriented than much of the previous work in the area, resulting in substantial gains to an understanding of the development of Mackenzie Inuit culture as expressed in archaeological sites. Importantly, Inuvialuit have been involved in much of the archaeological work undertaken over the past several decades, as members of field parties, as museum curatorial workers, and as traditional knowledge experts. Their participation has contributed in many ways to broadening and enriching knowledge of the archaeological record of the Mackenzie Inuit.

AN ARCHAEOLOGICAL PERSPECTIVE ON THE DEVELOPMENT OF MACKENZIE INUIT CULTURE

A culture-historical framework consisting of Thule, Mackenzie Inuit, and Early Historic periods modified from Betts (2009) is used here to organize archaeological sites found in the territories of Mackenzie Inuit regional groups, with the caveat that uncertainties exist when attempting to connect archaeological remains to historical realities (Figure 24.2).

Cultural Periods in the Mackenzie Inuit Area

Thule Period (A.D. 1200–1400)

There is general consensus amongst archaeologists that historic Inuit cultures originated from the Thule culture, which was carried into the Canadian Arctic and Greenland by people who migrated from Alaska along a maritime route early in the second millennium A.D., and which subsequently underwent cultural transformations as the Thule peoples colonized and adapted to new environments. Shoreline erosion likely has erased much of the archaeological evidence of the initial Thule migration in the western Canadian Arctic; however, a small number of sites in the Beaufort Sea–Amundsen Gulf area show that Thule was present in that region as early as the thirteenth century A.D. (Friesen, this volume, chapter 28; Friesen and Arnold 2008; Jensen, this volume, chapter 21; Morrison 2000).

As used here, “Thule period” refers to the time of initial appearance of people bearing the Thule culture in what was destined to be the Mackenzie Inuit area, and continuing

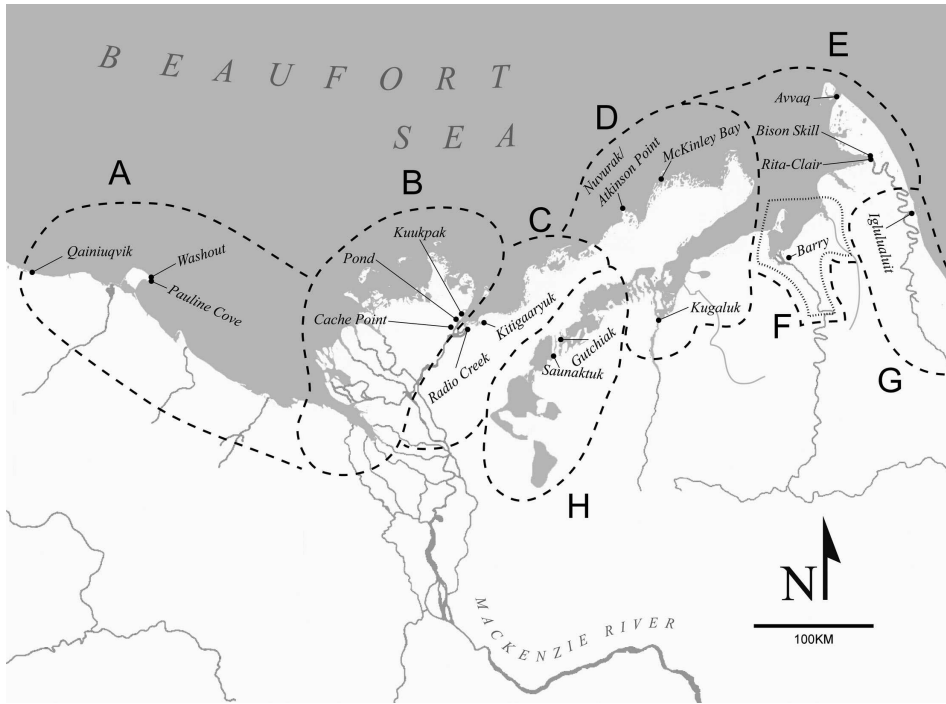


FIGURE 24.2 Locations of archaeological sites cited.

Map prepared by Matthew Walls

through a “settling in” period, when people adjusted to local conditions. Among the signature traits that distinguish this period are small single-roomed semisubterranean winter dwellings, harpoon head styles incorporating open sockets, and evidence from faunal remains for a narrower spectrum of food resources than was the case in later periods. In coastal localities, bowhead whales were an important source of food and raw materials.

Mackenzie Inuit Period (A.D. 1400–1880)

The Mackenzie Inuit period is defined by archaeological remains that provide evidence of settlement-subsistence patterns and material culture characteristic of regional Mackenzie Inuit groups as they existed prior to sustained exposure to the acculturative effects of Western society. Investigations at several archaeological sites have shown that the transition from the Thule period to the Mackenzie Inuit period had taken place by about A.D. 1400. A greater variety of artifacts are found when compared to the Thule period, and there is more stylistic variation within certain artifact categories. Harpoon heads are predominantly closed socket forms, and tend to be more robust than in the Thule period. Net fishing was an important part of the food-capturing technology throughout much of the Mackenzie Inuit region. Winter dwellings were generally larger than in the Thule period, and they commonly had two or three sleeping alcoves.

The Mackenzie Inuit period continued for some years after European trade goods first became available in the 1800s. When those introduced goods are found in archaeological sites and in ethnographic collections attributed to this period they appear as additions to, or enhancements of, traditional technologies rather than as wholesale replacements.

Historic Period (A.D. 1890 to Present)

The Historic period is marked archaeologically and otherwise by the widespread adoption by Mackenzie Inuit of Western material culture. Although multiple factors are likely to have been involved in this cultural turning point, a major contributing event was the appearance in the Mackenzie Inuit area of American whaling ships that also carried out trade as a sideline. In the early decades of the Historic period, Mackenzie Inuit continued to follow an annual cycle of hunting and fishing, but trapping of fur-bearing animals and trips to trading posts were now essential components of their seasonal activities. The ability to survive still depended on an intimate knowledge of the land, and traditional values such as cooperation and sharing still permeated society, but manufactured tools, firearms, steel traps, canvas tents, and other items of Western material culture replaced traditional material culture.

The Development of Mackenzie Inuit Culture in the Kangmallit Bay Area

Kuukpangmiut and Kitigaaryungmiut

The most comprehensive archaeological evidence of the development of Mackenzie Inuit culture has been found at sites on the shores bordering the shallow water estuary that extends from the mouth of the East Channel of the Mackenzie River to Kangmallit Bay (see Figure 24.2). This area is at the intersection of the traditional territories of the Kuukpangmiut and the Kitigaaryungmiut, two regional groups of Mackenzie Inuit that may have been distinct more in name than in lifestyles. The main winter village of the Kuukpangmiut, known as Kuukpak, was located on the north shore of the estuary. Kitigaaryuk, the main winter village of the Kitigaaryungmiut, was located almost directly opposite on the south side of the estuary.

The Kangmallit Bay area contains an abundance of resources that have been important as sources of food and raw materials for Mackenzie Inuit and their ancestors. Driftwood carried down the Mackenzie River was of singular importance, providing fuel, building materials, and a versatile material for fabricating artifacts. Migratory waterfowl are seasonally numerous, and caribou, while scarce in the area today, in earlier time periods may have been present in larger numbers while traveling to and from summer calving and feeding ranges. Animals such as beaver, muskrat, and moose that are not normally found in arctic environments find their way into this area from the wooded Mackenzie River Delta a short distance to the south.

However, it is the estuary and the resources it provides that have put a particular stamp on cultural adaptations in this area. The nutrient-rich waters flowing from the Mackenzie River support a wide variety of sedentary and anadromous fish, and Kangmallit Bay is an important congregating area for beluga whales that travel there in the thousands in late June and July. While there may be other factors involved, it is believed that belugas are attracted to the estuary by warm waters that trigger molting of their outer layers of skin.

The Kuukpangmiut and the Kitigaaryungmiut employed similar techniques for hunting beluga whales in the estuary. As Nuligak, who was born near Kitigaaryuk, recalled from his childhood in the late 1800s (Metayer 1966), and as witnessed by Hugh Lowther in 1888 (Krech 1989) and by Isaac O. Stringer in the 1890s (Friesen 2004), people would gather in large numbers in summer at locations where beluga whales could be chased into narrow channels and shoals in the estuary by hunters in kayaks. The carcasses were towed to tent encampments on nearby beaches, where the whales were butchered and processed, with meat, blubber, and oil being stored at nearby winter houses to which they returned at the beginning of winter. At other times of the year they dispersed in smaller groups in their respective territories to hunt and fish.

Archaeological investigations of winter house remains and middens at four sites located in the inner part of Kangmallit Bay have provided key evidence of the development of this subsistence pattern: Radio Creek and Kitigaaryuk on the southern shore of the estuary (McGhee 1974), and Cache Point (Arnold 1994; Friesen 2009), Pond, and Kuukpak (Arnold 1994) on the north shore. A chronology of the occupations at these sites based on AMS radiocarbon dates on terrestrial materials and on artifact styles, and the cultural periods represented, is shown in Table 24.1.

The relative dates of these sites and their locations in the estuary are consistent with oral histories that tell of periodic relocations of settlements in response to reshaping of

Table 24.1 Ages and Cultural Phases of Archaeological Sites at Kangmallit Bay (Modified after Betts 2009)

Period	Site	Date Range (a.d.)
Thule	Cache Point	1250–1400
	Radio Creek	1250–1400
	Pond	1350–1400
Mackenzie Inuit	Kitigaaryuk	1400–1890
	Kuukpak	1400–1890
Historic	Kitigaaryuit	1890–present

Note: The "Date Range" indicates a period within which the occupation indicated is likely to have occurred, and not the actual duration of the cultural period at the site.

the estuary brought about by the accumulation of silt carried down the Mackenzie River. According to “Roxy” Memurana, who was born at Kuukpak in the late 1800s, “in his great-grandfather’s time” there were villages upstream from Kuukpak and Kitigaaryuk that had been abandoned when the nearby waters became too shallow for hunting beluga whales (Stefánsson 1919:170). Evidence of this process can be seen at the Cache Point and Pond sites, where extensive foreshore flats that now exist in front of those sites likely were shoals and shallow channels—ideal locations for hunting beluga whales—when people lived at those locations. Likewise, Radio Creek is located upstream of the current range of beluga whales. This periodic relocation of winter villages undoubtedly helped preserve archaeological remains that might have been obscured had there been continuous occupation over a longer period in a single locality.

The Thule period in Kangmallit Bay is represented by winter house remains at the Cache Point and Pond sites, and by the remnants of the only house at the Radio Creek site that had escaped erosion at the time of McGhee’s excavations in 1970. Radiocarbon dates on samples from one of the houses at Cache Point indicate that the Thule period could have commenced in this area by the late thirteenth or early fourteenth centuries A.D., although the other houses are somewhat later (Friesen 2009). The Pond site most likely dates to the end of the Thule period, and arguably is transitional Thule–Mackenzie Inuit.

The earliest Thule-period houses were small semisubterranean dwellings fashioned from driftwood logs, that had a single room, long tunnel-like entranceway, and external kitchen, the last perhaps used in order to prevent smoke from driftwood cooking fires from contaminating the air inside the dwelling (Friesen 2009; see also Figure 24.3a). The later houses often lacked these external kitchens, and by that time there is evidence that soapstone oil lamps that could be used for cooking inside the houses as well as for heat and illumination had become available through trade with Inuit in the Coronation Gulf region. At least one of the houses at the Pond site had two alcoves, each with a sleeping bench, facing toward a common central area, and may reflect a trend in the later part of the Thule period toward the larger, more complex houses of the Mackenzie Inuit period (Arnold 1988).

Faunal remains from Cache Point and Pond indicate that subsistence pursuits in the Kangmallit Bay area during the Thule period were based around a few key resources, predominantly beluga whales and fish (Betts 2009; Friesen 2009). Beluga whales are only present in summer, and presumably were hunted from kayaks. Several styles of harpoon heads used for hunting sea mammals have been found. Most common are harpoon heads with open sockets and lashing slots (Figure 24.4a, b), a widespread Thule form that may have been developed primarily for open water seal hunting but used in Kangmallit Bay for hunting beluga whales. More robust harpoon heads with closed sockets that may have been better suited to hunting beluga whales also are present (Figure 24.4c). The most common fish species in the Thule faunal assemblages is burbot, which remains active under the frozen surface of the estuary in winter, and fishing technology is dominated by ice fishing gear, including composite fishhooks with antler shanks and bone barbs (Figure 24.4d), jigging line holders (Figure 24.4e), ice chisels and ice scoops (Figure 24.4f). Evidence of net fishing in the earliest Thule houses is limited

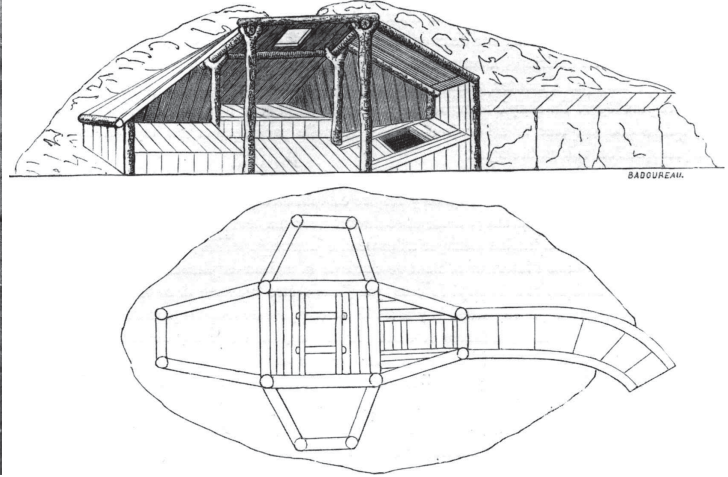


FIGURE 24.3 House types. (Left) Thule-period single room house with separate kitchen area, Cache Point House 8 (photo: Max Friesen); (Right) cruciform-shaped house, Mackenzie Inuit and early Historic periods (Petitot 1876).



FIGURE 24.4 Artifacts from Kangmallit Bay sites. (a) Open socket harpoon head with barbs: Cache Point; (b) open-socket harpoon head with endblade: Pond; (c) closed-socket harpoon head fitted for an end blade: Pond; (d) barbed fish hook: Kuukpak; (e) jigging line holder: Kuukpak; (f) ice scoop: Kuukpak; (g) net mesh gauge: Kuukpak; (h) net float: Kuukpak; (i) net weight: Kuukpak.

Image compiled by Charles Arnold

to a small number of net weights. Although the relative importance of net fishing, which is an open-water activity, cannot be reliably judged on the basis of evidence from winter-season dwellings, it may be significant to note that net fishing gear is more common in winter dwellings from the later part of the Thule period, perhaps attesting to an increasing importance over time of that fish-harvesting strategy.

The Mackenzie Inuit period is represented by archaeological remains at Kitigaaryuk and at Kuukpak, both of which were occupied from as early as A.D. 1400. The distinctive Mackenzie Inuit cruciform-shaped semisubterranean winter house is the most common type of dwelling at both sites. Named after their shape, these dwellings have a square central room surrounded on three sides by alcoves containing sleeping platforms, and an opening to a long entranceway on the fourth side (Figure 24.3b). While cruciform houses described by Petitot (1981 [1887]), and Stefánsson (1919:167) in the late 1800s and early 1900s reportedly were quite large, sheltering as many as 25–30 people, most archaeological remains of this type of dwelling are considerably smaller. At Kitigaaryuk a structure known as a *kadjigi* that stood in ruins during the early Historic period may have been built and used in the Mackenzie Inuit period, and the remains of a large, rectangular structure lacking interior details characteristic of domestic dwellings that was excavated at Kuukpak may also have been a *kadjigi*. This type of structure was reportedly used for a variety of community functions; it also served as a clubhouse of sorts for men, and may have been a response to crowding in domestic dwellings. Judging from the deep middens associated with most of the domestic dwellings at both Kitigaaryuk and at Kuukpak the winter houses saw repeated use over a number of years.

Beluga whales dominate the faunal assemblages from the Mackenzie Inuit period, and harpoon heads used for hunting them are predominantly sturdy closed socket forms (Figure 24.4c). Although fish jigging implements are common, artifacts associated with net fishing, including mesh gauges (Figure 24.4g), net floats (Figure 24.4h) and sinkers (Figure 24.4i), and fragments of nets made from baleen and willow root, were clearly an important part of the fishing technology, and fish remains include large quantities of whitefish, cisco, and other types that normally are caught with nets (Betts 2009; Friesen and Arnold 1995). Faunal remains show that a wide diversity of avian and terrestrial animals were also hunted, more so than in the Thule period.

Overall, the archaeological artifacts from the Mackenzie Inuit period in Kangmallit Bay closely resemble ethnographic artifacts from the Mackenzie Inuit area in museum collections, showing that a distinctive material culture was fully developed by that time. Nonlocal materials such as nephrite, copper, soapstone, and various types of stone used for making chipped stone tools are common in Mackenzie Inuit-period sites, which indicates that trade and presumably other types of interactions with neighboring groups were frequent occurrences.

Evidence of contact with Europeans at Kuukpak is limited to a few glass beads and several pieces of sheet copper found in ambiguous contexts. A map prepared by Count Edouard de Sainville (1984), a self-styled French explorer who spent the period 1889–1894 in the lower Mackenzie River area, shows a location marked *vieux village* (“old

village”) in the vicinity of Kuukpak. De Sainville’s notation can be interpreted as indicating that this longstanding community had been abandoned by that time, and quite likely the Kuukpangmiut who had lived there were early victims of foreign diseases.

Kitigaaryuk survived as a traditional Mackenzie Inuit community for a longer period of time. Items of European origin found alongside more traditional artifacts in one of the houses excavated by McGhee are indicative of the late Mackenzie Inuit–period pattern of technology incorporation rather than replacement. Kitigaaryuk was abandoned, although only temporarily, following a measles epidemic in 1902, when many people perished and the survivors fled. People began returning a decade later, but by that time effects of the fur trade and commercial whaling had transformed Mackenzie Inuit society. This Historic-period transformation was reflected in most aspects of material culture, including the use of imported wooden boats fitted with sails to hunt beluga whales. Kitigaaryuk was effectively abandoned again in the 1930s after the Hudson’s Bay Company moved its post to Tuktoyaktuk, although as has been extensively documented through a multiyear oral history project conducted by the Inuvialuit Social Development Program (Hart 2002), Kitigaaryuk has continued to be used as a seasonal hunting camp up to the present day.

Summing up, there is strong evidence from the archaeological record in the Kangmallit Bay area for continuous settlement and cultural development over a period of more than 500 years leading to the Kitigaaryungmiut and Kuukpangmiut who met the first European explorers in the early 1800s. Neither archaeology nor oral histories reveal how and when the territorial distinctions suggested by the separate names used by these groups emerged, but evidence of similar settlement-subsistence patterns and material culture, and most likely common customs and traditions, makes it likely that their histories were intertwined since the initial appearance of Thule culture in the area.

The Thule period represented at the Cache Point, Radio Creek, and Pond sites may have lasted several generations. During that time, people with a legacy of bowhead whale hunting that originated in Alaska learned to harvest beluga whales that migrate each summer to the estuary at the mouth of the East Channel of the Mackenzie River, using kayaks to drive them into narrow channels and onto shoals. Some of the surplus food from the beluga hunt was stored for later consumption in pits dug into permafrost alongside small, single-roomed, log-framed, and sod-covered winter dwellings located adjacent to beluga hunting and processing areas. These dwellings are typical of the Thule period throughout the western Arctic, as are most of the artifacts found associated with them. Archaeological investigations have focused on winter dwellings, but it is likely that people dispersed to other areas to hunt and fish for part of the year. Faunal remains and artifacts found in excavations of the winter dwellings and associated middens indicate that fish caught by jigging through holes cut into the ice-covered river and nearby lakes were an important contribution to the diet during the winter. Net-fishing technology may have been present, at least in low frequencies, throughout the Thule period; quite certainly it was used in the later part of the period. An increasing reliance on this fish-capturing technique may have been instrumental in the development of a

settlement pattern centered on stable winter communities, and conceivably was associated with the appearance of larger, more complex winter dwellings that appear late in the Thule period at the Pond site.

By A.D. 1400, archaeological remains in the Kangmallit Bay area closely mirror equivalent aspects of Mackenzie Inuit culture as remembered in oral histories, described in written documents, and represented by collections of ethnographic artifacts. The material culture was more diverse than in the Thule period, especially in terms of hunting and fishing equipment. Beluga whales were the single most important source of food, but faunal remains show that a broad spectrum of resources, including fish, birds, and other animals, also was harvested. The most common type of winter dwelling at the Mackenzie Inuit-period Kitigaaryuk and Kuukpak sites was the cruciform-shaped house. It has been suggested that these multifamily houses may have been a response to the onset of a cooling climatic episode, the "Little Ice Age," that occurred throughout the northern hemisphere at this time (Arnold and Hart 1991), and persuasive arguments have also been made that multifamily dwellings are a response to social factors associated with increases in population size (Friesen 1999, 2006). Deep midden deposits associated with the houses suggest that they were occupied on a seasonal basis over many years, and it may be at this time that individuals began to identify themselves, and others, as members of a regional group centered on one or the other of these villages (Betts 2009). Relations with people living outside the territories of the Kangmallit Bay area are indicated by the presence of a variety of nonlocal materials. By this time, Mackenzie Inuit had become established in adjacent regions, and likely were trading partners and participants in local and long-distance trade networks that extended far to the east and the west.

The Kitigaaryungmiut and Kuukpangmiut may have first heard about foreigners through these long-distance trade networks, people they first called *Krablunet*, although later the name *Tan'ngit*—a term that may originally have referred to Siberian Inuit—was applied to American whalers and eventually to Euroamericans in general. Rumors of these foreigners were soon followed by their appearance in the Kangmallit Bay and adjacent Mackenzie Inuit areas, ushering in changes that brought about the collapse of traditional Mackenzie Inuit culture.

Development of Mackenzie Inuit Culture in Other Regions

Archaeological evidence of the development of Mackenzie Inuit culture is less complete outside of the Kangmallit Bay area, due to factors ranging from extensive shoreline erosion to the amount of research that has been conducted in those areas. Despite gaps in the archaeological record, sites that have been excavated in other Mackenzie Inuit regions each contribute to an understanding of the development of and interaction between regional groups.

Qikiqtaryungmiut

The Qikiqtaryungmiut were the westernmost of the Mackenzie Inuit regional groups. Their name was associated with Qikiqtaryuk, a village that once existed on Herschel Island, and there is evidence that suggests other Qikiqtaryungmiut communities existed along the northern Yukon coast.

The most extensive archaeological record of the Qikiqtaryungmiut is revealed on Herschel Island where sites of the Thule, Mackenzie Inuit, and Historic periods have been excavated (see Table 24.2).

The Thule period is represented on Herschel Island by the remains of three small rectangular houses at the Washout site, the name of which reflects the toll that coastal erosion has taken on the site (Figure 24.2). The oldest house at Washout likely dates to the time of the initial expansion of the Thule culture from Alaska, around A.D. 1250. Two other houses, which contained closed socket harpoon heads, were occupied somewhat later in the Thule period. Large quantities of baleen associated with the houses indicate that bowhead whales were an important source of food (Friesen 2013; Friesen and Hunston 1994; Yorga 1980), which is typical of Thule in coastal regions.

The Mackenzie Inuit period is also represented at Washout and at the Pauline Cove site. The earliest dwelling from this period had a single room like those of the Thule period, while larger two-roomed houses appeared later in the period (Friesen 1994; Friesen and Hunston 1994). Comparisons of artifacts with Mackenzie Inuit-period sites at Kangmallit Bay show that the similarities are more general than specific. This could be due to in situ development in the two areas, but equally could be result of differences in resource harvesting and utilization within a shared cultural sphere. Betts (2009) has suggested that for much of the Mackenzie Inuit period, people living on Herschel Island hunted bowhead whales during their eastward migration at the beginning of the open-water season, with fish, caribou, and seals rounding out the subsistence base. One or two

Table 24.2 Ages and Cultural Phases of Archaeological Sites at Herschel Island (Friesen 2013).

Period	Site	Date Range (a.d.)
Thule	Washout	1250–1400
Mackenzie Inuit	Washout	1400–1650
	Pauline Cove	1500–1890
Historic	Pauline Cove	1890 +

Note: The "Date Range" indicates a period within which the occupation indicated is likely to have occurred, and not the actual duration of the cultural period at the site.

large whales caught each year conceivably would have provided enough surplus food to support an entire community residing in a winter village.

A shift in the Historic period to an economy based primarily on net fishing, sealing—including capturing seals in nets at ice leads—and hunting caribou is evident in archaeological sites and historical accounts. This shift may be attributable to the appearance in the eastern Beaufort Sea in the late 1880s of American whaling fleets that, in less than two decades, drastically reduced the bowhead whale populations in the western Arctic. The Qikiqtaryungmiut were on the front line of encounters with the whaling fleet that for more than a decade used Herschel Island as an overwintering and staging area. Population reductions as a result of exposure to foreign diseases, imported goods offered in payment for services and furs, and the presence of Alaskan Iñupiat hired as crew on the whaling ships all contributed to extensive alterations of traditional Mackenzie Inuit culture that is reflected in written records, oral histories, and Historic-period archaeological remains at Pauline Cove. The Historic-period Qainiuvik site at Clarence Lagoon on the north Yukon coast (Lyons 2004) shows that the reverberations of the whaling fleet were widespread throughout the Qikiqtaryungmiut region.

Nuvugarmiut

At the time of first contact with Europeans in the early 1800s, the Nuvugarmiut occupied the coast and interior of the Tuktoyaktuk Peninsula, with their main winter village, Nuvurak, located near present-day Atkinson Point. The Nuvugarmiut did not survive as a distinct people beyond the early Historic period, and Nuvurak has been entirely lost due to shoreline erosion. However, oral histories and eyewitness accounts of cruciform houses at Nuvurak by early explorers (Franklin 1828), together with artifacts collected from the vicinity of Nuvurak (Mathiassen 1930), attest to the Nuvugarmiut being a Mackenzie Inuit regional group.

Other than the Atkinson Point collection described by Mathiassen (1930), archaeological evidence of the Nuvugarmiut has been studied primarily at only two locations. The McKinley Bay site on Tuktoyaktuk Peninsula contains the remains of cruciform winter dwellings that have been radiocarbon dated to the period A.D. 1500–1650 (Arnold 1991; Betts 2007). Although any connection drawn between the occupation at the McKinley Bay site and the historically known Nuvugarmiut must remain tentative, evidence of bowhead whales at the site, which Betts concludes were taken during late summer and fall during their return migration to wintering areas in the Bering Sea, corroborates information from historical records and oral histories that hunting large whales provided the main source of food needed to support residence in winter villages in this area. Potentially, this presents a scheduling conflict with the need to hunt caribou in the fall, when their hides are in prime condition for making winter clothing. Morrison's (1988) excavations at the early Historic period Kugaluk site, on the opposite side of the Tuktoyaktuk Peninsula, show that that some Nuvugarmiut may have focused on the fall caribou hunt and traded hides with coastal groups. Another solution for obtaining caribou hides may have been to raid neighboring groups, a practice that was not uncommon in other Mackenzie Inuit regions, judging from oral histories and in the eyewitness account of Roderick MacFarlane (1891).

Avvarmiut

The Avvarmiut of the Cape Bathurst area are not well known in either oral histories or in historical accounts. Based on indirect evidence, Betts (2009) suggests that, like the Nuvugarmiut, residence in their main winter village at Avvaq was made possible by hunting bowhead whales in late summer and fall. No coastal sites have been excavated, but a caribou-hunting component has been documented by Morrison (1997) through his investigations of the Bison Skull and Rita-Claire sites, both of which have Mackenzie Inuit and early Historic-period components.

Anderson River People

In 1857, the Hudson's Bay Company employee Roderick MacFarlane traveled to the Anderson River area to explore the potential of direct trade with the people who lived along the lower part of the river and in Liverpool Bay (MacFarlane 1891). Finding a resident population and an abundance of furbearing animals, he returned a few years later to establish a trading post, Fort Anderson. When Roman Catholic priest Émile Petitot visited Fort Anderson in 1865 he met and traveled to the mouth of the Anderson River with members of that group who, he wrote, referred to themselves as "Kramalit" (Petitot 1878 [1876]:404), although it is quite likely that they in fact were Avvarmiut, who traditionally traveled to the lower courses of the Anderson River to hunt caribou at river crossings during their fall migrations. Save for Petitot's observations and a collection of approximately 300 artifacts acquired by MacFarlane (Lyons et al. 2011), little is known about the Anderson River people. Soon after Petitot's visit, diseases decimated the local population, and Fort Anderson was closed. The artifacts acquired by MacFarlane, which are now housed at the Smithsonian Institution, for the most part reflect traditional Mackenzie Inuit technology, although blades made of iron obtained through trade were used on many of the tools that would earlier have been edged and tipped with ground slate or chipped stone, and glass trade beads were used for decoration. From Petitot's writings we know that the people who traded at Anderson River hunted bowhead whales, and presumably their subsistence pattern prior to being drawn into the fur trade was similar to that of the Nuvugarmiut and the Avvarmiut. The only archaeological work conducted in this region has been David Morrison's (1989) excavations at an early Historic-period winter house at the Barry site, located at the mouth of the Anderson River.

Igluyuaryungmiut

Archaeological evidence of another regional group of uncertain identity, but who were affiliated with or at least similar to the Mackenzie Inuit, has been found along the coast of Franklin Bay to the east of the Avvarmiut. Morrison (1990) has suggested that an archaeological site known in local traditions as Iglulualuit shared many similarities with Mackenzie Inuit, including artifacts and cruciform houses. In keeping with naming conventions, Morrison has proposed the name Igluyuaryungmiut for people who lived in the area from about A.D. 1400 until sometime in the 1800s, when disease, and possibly starvation, resulted in the area being abandoned.

Faunal remains show that seals were the economic mainstay at Iglulualuit, and supported what appears to have been sedentary winter residence at this community. This contrasts with settlement-subsistence patterns in the Central Arctic, where a focus on hunting seals in winter required a mobile lifestyle and short-term residence in snow houses, and raises the interesting possibility that cultural traditions shared with other Mackenzie Inuit groups were as important as environmental factors in influencing settlement patterns.

Imaryungmiut/Inuktuyiut

One of the most enigmatic of the presumed Mackenzie Inuit regional groups was the Imaryungmiut, remembered in oral histories as people who lived year round in the area around Eskimo Lakes (Imaryuk). Beluga whales occasionally enter the this series of lakes from Liverpool Bay, sometimes getting trapped there during freeze-up when they can be hunted from the edge of the ice as the ever-diminishing size of the open-water areas brings them within range of the hunters. The lakes are richly endowed with fish of various species, and nearby are routes followed by caribou as they move between summer and winter ranges, and waterfowl of various species either stage or nest in the area.

Archaeological information that may pertain to the Imaryungmiut comes primarily from the Saunaktuk and Gutchiak sites, both situated at the tips of long peninsulas that extend into Eskimo Lakes. Radiocarbon dates on Saunaktuk, and styles of artifacts found at both sites, suggest that both date to about A.D. 1400–1500 (Morrison and Arnold 1994). A link to the Imaryungmiut known through oral histories is provided by startlingly close correspondences between evidence of trauma on human skeletal remains found at Saunaktuk and details of a massacre of Imaryungmiut at that location that are still recalled in local legends after many centuries (Arnold 1990; Melbye and Fairgrieve 1990). If the winter occupation at Saunaktuk and the summer occupation at Gutchiak are connected, this provides further corroboration of oral histories of a resident group of people in the Eskimo Lakes area.

The Imaryungmiut, if indeed they were a separate regional group, seem not to have survived into the Historic period, by which time the western shores of Eskimo Lakes were within the hunting territory of the Kitigaaryungmiut. Local oral histories link the disappearance of the Imaryungmiut to feuding with Kitigaaryungmiut, who periodically raided the Imaryungmiut to obtain caribou skins. According to these legends, a young man from the Imaryungmiut group killed one of the Kitigaaryungmiut during one of these raids. Acting on their belief that they could kill only for food, others in his group compelled the young man to eat the corpse. Thereafter, they were known as cannibals (Inuktuyiut), and fled their territory in shame.

SUMMARY

Archaeological evidence provides a 500- to 600-year record of the development of a complex hunting and gathering society along the mainland coast and interior of the

western Canadian Arctic that is remembered in local oral histories as the Siglit, and referred to here as Mackenzie Inuit. The first Euroamericans to travel into this area encountered highly territorial groups of people residing in regions centered on a main winter village, who saw themselves as distinct from their neighbors, though oral histories and archaeology show that they were linked by common histories and ongoing interactions.

Mackenzie Inuit culture developed from the Thule culture over the period A.D. 1300–1400. This is best documented by archaeological sites in Kangmallit Bay near the mouth of the Mackenzie River. Thule people apparently were attracted by resources available in the estuary at the head of the bay, and over time gained knowledge and skills that allowed them to shift their subsistence from a focus on pursuing bowhead whales to a reliance on seasonally abundant beluga whales and a greater emphasis on fishing. This economic shift is reflected in changes in material culture that likely involved adaptations, innovation, and perhaps borrowing from groups in Alaska. Villages of winter dwellings established at key beluga whale-hunting locations were seasonally occupied over long periods of time until local environmental changes necessitated relocating to other nearby areas.

There is not a sharp distinction between the Thule period and the Mackenzie Inuit period. In the Kangmallit Bay area, the range of resources utilized was wider than in the Thule period. This may have been a consequence of a more intimate knowledge of the environment, but might also have been linked to a need to forage more broadly to support an increase in population size. Changes in material culture are seen in the widespread use of net-fishing gear, and a greater stylistic diversity within some categories of artifacts during the Mackenzie Inuit period. Semisubterranean wood-framed winter dwellings were larger than in the Thule period, and often had multiple alcoves to accommodate larger numbers of people residing together. Population increases, communal hunting activities, and congregation of long duration in winter villages are likely to have resulted in a strong sense of community and territory in Kangmallit Bay and self-identification by two groups, the Kitigaaryungmiut and the Kuukpangmiut, by the time of first contact with Europeans.

Concurrent and similar historical processes and cultural developments are seen in the archaeological record in neighboring regions. Although the nature of the resource base and harvesting strategies differed to a degree in each of the Mackenzie Inuit regions, common to most areas was stable residence in winter villages, made possible by surpluses of food stored for winter consumption supplemented by ice fishing in the winter months. As in the Kangmallit Bay area, the development of stable winter communities may have been a key factor in the development of regional identities.

Whether the regional groups had a common origin arising from cultural developments in a single area followed by dispersal into neighboring territories, or if each originated autonomously, cannot be determined absolutely from available evidence. Regardless of origins, ongoing interchanges of ideas, and probably of people as well, would appear to underlie the cultural similarities that are evident in archaeological sites, historical documents, and oral histories of the Mackenzie Inuit.

The superb adaptations developed by Mackenzie Inuit and the strength of their traditions made them more than a match for Europeans who intruded into their territories through the first half of the nineteenth century. However, no resistance was possible to foreign diseases that triggered a widespread collapse of traditional Mackenzie Inuit society by the end of that century, making the survivors vulnerable to acculturative forces that shaped the culture of their descendants, who refer to themselves today as Inuvialuit. Despite the changes that have taken place over the last century, the Inuvialuit look to their Mackenzie Inuit heritage as a source of cultural strength and pride.

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CHAPTER 25

THE ALEUTIAN TRADITION

The Last 4,000 Years

DEBRA CORBETT AND MICHAEL YARBOROUGH

INTRODUCTION

THE Aleutian tradition comprises a cultural continuum that lasted from roughly 4000 B.P. to the time of Russian contact. The tradition is known from throughout the Aleutian archipelago, with a vague eastern boundary on the adjacent Alaska Peninsula (McCartney 1984). The Aleutian Islands form a 1,000 km arc of mostly submerged volcanic mountains extending across the North Pacific Ocean between Alaska and Kamchatka. At the time of their discovery by the Russians in 1741, and for thousands of years previously, people variously known by a host of regional autonyms and collectively as Aleuts, Unangan, or Unangas (plural collective Unangax) occupied the islands.

An abundance of ethnohistorical texts describing the historic groups of the Aleutian Islands offers a glimpse of the precontact Unangax life way. The most useful for understanding the Unangax peoples and the tumultuous changes stimulated by contact with Russian mariners in the late eighteenth and early nineteenth centuries include (Bergsland 1959), Hrdlička (1945), Jochelson (1933), (Lantis 1970), Laughlin (1980), and Veniaminov (1984 [1840]).

From these sources emerges a view of one of the world's most highly specialized and successful maritime hunter-gatherer adaptations. At the time of Russian contact, some Unangax groups lived in villages of large, semisubterranean houses occupied by multiple families. During the summer season, some groups undertook voyages of trade and warfare, frequently covering distances of hundreds of kilometers, while others took advantage of relatively calm summer weather to travel to locations with seasonally abundant subsistence resources. These activities produced a landscape dotted with numerous small archaeological sites, punctuated by larger villages, gathering spots for communal social and religious activities during the dark and stormy months of winter. The "central places" are marked by thick midden mounds that contain the remains of

the full spectrum of maritime subsistence resources. The immense size of some mounds suggests continual use, at least seasonally, for thousands of years.

DEFINITION OF THE ALEUTIAN TRADITION

The Aleutian tradition was first defined by Allen McCartney (1984). Prior to McCartney, Aleutian researchers had, of course, noted broad cultural continuity through time and across space. Even the first investigator, William H. Dall (1877), while dividing Aleutian prehistory into three periods, noted that the overall picture was of continuity with gradual, in situ, development over time. Although Jochelson (1925) decisively refuted Dall's phases and did not define periods in a prehistoric sequence, he also observed cultural continuity with only gradual changes. Physical anthropologists Hrdlička (1945) and Laughlin and Marsh (1951), who described two distinct phenotypes, found no clear distinction in the material culture left by either "Paleo-Aleuts" or "Neo-Aleuts." The chronological break between the two phenotypes is placed around AD 1000, as discussed below (cf. Maschner, this volume, chapter 13). Laughlin (1980) even considered Aleuts "the survivors of the Bering Land Bridge," positing 10,000 years of continuity.

McCartney divided Aleutian prehistory into a "dual tradition"; an earlier Anangula tradition until 4000 B.P. and the period from 2500 B.C. to A.D. 1800, comprising the Midden period or Aleutian tradition. In addition to the aforementioned cultural continuity, McCartney noted strong horizontal relationships across the archipelago and attributed this cultural homogeneity to a common insular environment, common marine-oriented procurement systems, movements of people through marriage, trade and war, and to geographic isolation (McCartney 1977). In spite of the homogeneous nature of the archaeological record, McCartney did define an Izembek phase, centered on the Alaska Peninsula, and a Western Aleutian phase, on the western islands (McCartney 1971, 1974).

The relationship of the Aleutian tradition to the earlier Anangula tradition remains contentious. Continuity between the two was long postulated, but supporting evidence was largely conjectural. The supposed links included house forms, hearth placement, the use of ocher, the presence of lamps, grinding implements, and other generalized tool categories, as well as the presence of microblades in later sites (Del Bene 1982; Laughlin 1974–1975). Since the 1990s, the 3,500-year gap between Anangula and later Aleutian tradition sites has narrowed to 2,000 years, between 6,000 and 8,000 years ago. Technological continuities in certain classes of stone artifacts makes the argument for continuity more feasible (Dumond 2001; Hatfield 2010; Knecht and Davis 2001).

The Aleutian tradition was based on a nearly exclusive economic reliance on marine resources. Key to this adaptation was the skin-covered kayak, or *Iqyaĵ*. *Iqyaĵ* were the supreme technological achievement of the Aleut built for speed and rough seas (Dyson 1991; Laughlin 1980). The basic form had a single hatch for one man, but two hatch boats were common. Three-hatch *Iqyaĵ* were invented in the Near Islands: "[Aleut] pursue

the animal (sea otters) in small hide baidarkas with one, two or three men in each" (Dmytryshyn et al. 1988). This type of kayak was transferred to the eastern islands and Kodiak by Russian administrators by the 1790s. Aleut "sea-riders" regularly cruised at speeds of between 7 and 10.6 km per hour while sprint speeds could approach 18 km (Veniaminov 1984 [1840]). Kayak load capacity is estimated at 200–350 kg (Liapunova 1996). Hunters regularly spent 12 hours at sea but could remain out as long as six days.

Along with this technological wonder, hunters possessed an elaborate technology of stone and bone. The stone-tool technology was based on irregular cores and flakes (McCartney 1984). Tools included bifacially flaked projectile points, stemmed knives, often with asymmetrical blades, large thick knives, a wide variety of scrapers and abraders, and a smaller variety of polished knives and adzes (Hatfield 2011; Jochelson 1925). Beach cobbles were used as hammers, anvils, pounders, choppers, and, slightly modified with notches or grooves, for sinkers. Bone tools consisted of a dizzying array of 260 described "types" of barbed and unbarbed spear, harpoon, and dart points, along with foreshafts, clubs, fishhooks, chisels, awls, needles, and decorative items. Whale bone furnished structural elements in houses and in burials. Perishable objects, made from wood, bark, skins, fur, feathers, and grass are well represented from caves in the Islands of the Four Mountains (Hrdlička 1945). From site KIS-008 on Buldir Island wooden artifacts included platforms and spindles for bow drill fire starters, model kayak parts, projectile points, and wedges (Corbett et al. 1997).

HISTORY OF RESEARCH

Unalaska Bay, on the northeast coast of Unalaska Island, is among the most intensively studied regions in the Aleutians. The earliest archeological investigations were undertaken in the late nineteenth century by William Dall (1877) and Alphonse Pinart (McCartney 1967:41), and in the early and mid-twentieth century by Waldemar Jochelson (1925) and Aleš Hrdlička (1945). The early researchers laid the foundation for all subsequent work in the Aleutians, identifying an "Aleut Pattern" of long-term and stable occupation with similar procurement strategies, and postulated a focus on maritime adaptation as the unifying theme for subsequent researchers.

Detailed descriptions of bone artifacts collected during World War II, on Amaknak Island in Unalaska Bay, were instrumental in defining the Aleutian tradition (McCartney 1967). Lt. Commander Alvin Cahn's collections were and are among the largest and most significant Aleutian artifact collections. After the war, a wave of research included work by Bank (1953, 1956, 1977), McCartney, the Veltres, and Aigner (McCartney 1984; Veltre and Smith 2010), and (Bacon 1977). These projects provided abundant data for Aleut settlement and economic pattern studies. One of the largest excavation projects, at Reese Bay, site UNL-00063, examined Aleut adaptations and acculturation to Russian colonization (Black 1991; Veltre 2001). In the late 1980s, research conducted to mitigate impacts from development projects, led to three developments that fundamentally

altered traditional understanding of eastern Aleutian prehistory from 5500 to 3000 years ago (Knecht 2001a; Knecht 2001b; Rogers 2011).

One of the most significant recent developments in Aleutian archaeology resulted in the definition of the Margaret Bay phase, dated 4000–3000 B.P., with its substantial stone-walled houses and a unique system of internal ventilation (Knecht, Davis, and Carver 2001; Rogers 2011). Subsistence during this phase represents a unique adaptation to seasonally ice-covered seas with ice-dependent species such as ringed and ribbon seal, polar bear, and walrus, along with the Aleutian triad of harbor seal, sea lion, and fur seal (Crockford 2012; Davis 2001).

A second result of Unalaska Bay research was the recognition of a 5,500-year occupation sequence, demonstrating changes in subsistence, technology, and architecture, which has demolished the paradigm of a uniform, barely changing, Aleutian tradition (Laughlin 1980). Finally, the discovery of Early Anangula tradition occupations in Unalaska Bay narrowed the gap between Early and Late Anangula Phases from over 3500 years (Del Bene 1982; Laughlin 1974–1975) to just 2,000 years (Dumond 2001; Hatfield 2010; Knecht 2001a). With more than one site, this early occupation is a phase rather than an anomaly.

Adjacent Umnak Island contributed equally in defining the Aleutian tradition. The Anangula site, SAM-012, found in 1938 on Ananiuliak Island, 5 km, northwest of the modern village of Nikolski on Umnak Island, was, for a generation, the oldest site in the Aleutians (Laughlin and Marsh 1951; McCartney 1984). Sandy Beach Bay, SAM-009, and possibly the poorly described Anangula Village site, are considered by some to be the earliest Aleutian tradition occupation in the chain, dating to between 5500 and 4300 B.P. Sandy Beach Bay artifact types show vestiges of the earlier Anangula blade technology with the bifacial and bimarginal retouch characteristic of the Aleutian tradition (Aigner 1983).

Far more significant for defining the Aleutian tradition is the Chaluka mound, SAM-001, at the modern village of Nikolski. The early and middle occupation levels of the Chaluka site date from about 4000 to 3000 B.P. (Aigner 1974:16; Aigner 1978; Laughlin 1961, 1974–1975, 1980). Stone tools are approximately equally split between unifacial and bifacial flaking technology (Denniston 1966). In the upper levels, dating to about the first millennium A.D. and separated by about 1,000 years from middle Chaluka, the stone tools are bifacially flaked. Large thick knives, stemmed knives with asymmetrical blades, stone chisels, and notched stone sinkers are common. In late Chaluka, after about 450 B.P., artifacts of polished slate appear (Dumond 1987).

Many of the patterns and traits elaborated upon by the post-1990s work in Unalaska Bay were first documented at Chaluka in the 1960s, including the establishment of an Aleut pattern of long-term sedentism and the focus on a maritime adaptation (McCartney and Veltre 1999; Veltre 1998). Arctic Small Tool tradition-like stone artifacts, and stone-walled houses were first described by Aigner (1978). Although cultural continuity and uniformity was stressed in the reports about Chaluka, researchers also documented gradual change in material culture (Aigner 1974, Laughlin 1961, 1974–1975, 1980; Laughlin and Marsh 1951).

Prior to the 1970s, archaeological work in the Central Aleutians was small scale and remains largely unpublished, and even now the central Aleutian Islands remain the least

known archaeologically. Veltre's PhD dissertation research at Korovin'ski was, for 30 years, the only reported excavation (Veltre 1979, 2001). In the 1980s, the central Aleutian Islands were intensively surveyed by the Bureau of Indian Affairs (BIA), investigating historic and cemetery site land claims for the Aleut Corporation (Frohlich 2002; Pratt 2009; Veltre 2012). Between 2005 and 2007, the Central Aleutians Archaeological and Paleobiological Project, working on northern Adak Island, studied the human and environmental history of Adak, to "provide a more comprehensive understanding of human, natural and geological systems" in the Aleutian Islands (West et al. 2012).

Ongoing work on western Adak focuses on the use of island interiors where, to date, twenty sites are recorded in a variety of topographic settings, including the shores of small lakes, hilltops, and in the passes between embayments. Radiocarbon dates as early as 1500 B.P., extend up to the last several centuries, demonstrate these are not modern features (Hanson and Corbett 2010).

In the 1960s, Amchitka Island in the Rat Islands became the focus of prolonged archaeological investigations prior to the testing of three nuclear devices by the US Atomic Energy Commission (Cook et al. 1972; Desautels et al. 1971; McCartney 1977). Most of the published work is descriptive, with little attention directed toward understanding cultural development, although McCartney's (1977) description of settlement patterns is a classic treatment. Surveys by the BIA and the US Fish and Wildlife Service added substantially to the number of sites known for the island group. Excavations are still limited (e.g., Cook et al. 1972), but the recent research on Hawadax and Kiska Islands has refined the cultural chronology and contributed considerable economic data (Bond and Brake 2008; Funk 2010, 2011b; Lech et al. 2012).

Four seasons of excavations between 1991 and 2001 at Buldir Island's single site focused on the island's role in the cultural history of the western Aleutians and on reconstruction of the paleoenvironment (Corbett 2011; Corbett et al. 1997; Lefevre 1997). This work remains incompletely reported.

In the Near Islands, Jochelson excavated portions of three village sites on Attu, and Hrdlička worked through several sites on Agattu (Hrdlička 1945; Jochelson 1925). The only fully reported excavation in the Near Islands is that of (Spaulding 1962) from Agattu. BIA archaeologists surveyed prehistoric sites on Agattu and the Semichi Islands and the historic village on Attu. From 1999 through 2003, the Western Aleutians Archaeological and Paleobiological Project (WAAPP) surveyed portions of Attu, locating and testing 21 previously unreported sites and making substantial excavations in two sites (Corbett 2011; Corbett et al. 2001; Lefèvre et al. 2001; West et al. 1999).

SPACE AND TIME

While Aleutian archaeologists have long emphasized the continuity of material culture over at least 4,000 years, some postulate considerable cultural diversity along the length

of the Aleutian Island chain, with variability in human phenotypes, with at least three language dialects and differences in subsistence patterns, artifact styles, settlement organization, and house form (Bank 1953; Dumond 2001; Turner and Turner 1974). These differences are poorly defined but McCartney identified a Western Aleutian phase to describe the most stylistically divergent Aleutian tool kit (Black 2003; McCartney 1971). Among the distinct artifacts are dense ivory blunts, flaring tipped bone harpoon foreshafts, and diamond-shaped tangs on unbarbed bone fishhooks. The dominant stone point type is long with parallel sides, usually on green propylitized andesite, and often finely flaked with serrated edges. This unique assemblage is present throughout the 4,500-year sequence of occupation of the Near Islands (Corbett et al. 2010; Spaulding 1962).

Cultural continuity has been interpreted to indicate cultural isolation of the Aleutian Islands (Corbett, Lefèvre, and Siegel-Causey 1997; Dumond 1987; McCartney 1984). Others argue that the people were subject to regular influences from their neighbors on the Alaska Peninsula and Kodiak archipelago (Desautels et al. 1971; Holland 2001; Knecht, Davis, and Carver 2001). Between 4000 and 3000 B.P., assemblages from Margaret Bay and Amaknak Bridge contain Arctic Small Tool tradition-like elements, such as polished and unpolished burins, "small and round beaked end scrapers, bell shaped scrapers, polished adzes, fine pressure flaking, and incised artwork," offering evidence of "sustained contact" with the Alaskan mainland (Dumond 2001; Hatfield 2010; Knecht, Davis, and Carver 2001; Maschner and Jordan 2001).

After about 1500 B.P., a wave of cultural change engulfed the islands: sites reflect an increasing population with numerous cultural connections to the east (Dumond 2001; Holland 2001). People, ideas, and technology traveled from the greater Gulf of Alaska region, specifically Kodiak Island. The earliest known Neo-Aleut burial on Akun Island (ca. A.D. 780) quite possibly represents the vanguard of new immigration (Holland 2001). Technological imports included slate and jet, dogs, caribou hides, and antler (Holland 1992, 2001). An equally profound cultural shift, about 850 B.P., is signaled by the appearance of ethnographically known multifamily longhouses in several variants, distributed from the Alaska Peninsula to the Islands of Four Mountain (Maschner 1999; Veltre and Smith 1988). About the same time, a suite of artifacts, including iron knives, mammal bone awls, nipple-ended needles, symmetrically barbed harpoon heads, conically tanged arrowheads, and new styles of decoration, signaled increased interisland contacts (Desautels et al. 1971; Dumond 1987; Laughlin and Marsh 1951). Changes in ceremonial and expressive culture accompanied a marked increase in warfare (Bank 1953; Corbett, Lefèvre, and Siegel-Causey 1997; Maschner and Reedy-Maschner 1998). This shift occurred contemporaneously with cultural changes in coastal regions throughout the Gulf of Alaska, coinciding with the onset of the Little Ice Age. Around 400 years ago, another artifact horizon appears in the eastern Aleutians employing traits such as rod-like socketed foreshafts and projectile points, tubular sockets with bifurcate tangs, small bilaterally barbed bone harpoon points, and bear figurines (Knecht and Davis 2001; McCartney 1971).

REGIONAL PERIODIZATION IN THE EASTERN ALEUTIANS AND ALASKA PENINSULA

Until recently the cultural continuity paradigm precluded the recognition and definition of phases within the Aleutian tradition. Archaeological investigation in the past 20 years has led to several regional cultural sequences with fully developed phases identified for the Lower Alaska Peninsula and Unalaska Bay.

Maschner's Alaska Peninsula chronology defines nine phases based primarily on distinctions in house size and shape (Maschner 1999; Maschner et al. 2010). The earliest well-attested occupation is the Moffett Phase (4800–4250 B.P.), almost 3,200 years younger than Anangula. Houses of the Russell Creek Phase (3750–3300 B.P.) share traits with the Margaret Bay Phase in Unalaska Bay, including stone-lined box hearths. During the Adamagan Phase (2700–2050 B.P.), houses and villages became very large, and more numerous. According to Maschner et al., “one of the major events in the archaeological record of the greater North Pacific region” was the settlement and growth of Adamagan village at the head of Morzhovoi Bay on the western Alaskan Peninsula (2010:172). Between 400 B.C. and A.D. 100 this settlement may have had as many as 500 people living in 100 houses.

Another population expansion occurred ca. A.D. 1100, signaled by the growth of large villages with prominent midden mounds, and the sudden appearance of Peninsula-style longhouses across a wide swath of the eastern Aleutian landscape (Hoffman 2002; Maschner et al. 2010; Wilmerding 2005); a phenomenon that defines the Cape Glazenap phase (850–700 B.P.). These features, with associated side rooms, have also been called nucleus-satellite houses. During the Izembek phase, 700–500 B.P., the longhouses disappear and small settlements reappear. Finally, after A.D. 1500 and into the nineteenth century, during the Morzhovoi phase, an influx of people to the region once again resulted in the development of huge villages, some with as many as 25 Peninsula-style longhouses. Craft specialization and increased warfare are in evidence, according to (Hoffman 2002; Maschner 1999).

Maschner has expanded this chronology to the Port Moller Hot Springs site, and to Sanak Island, while recognizing sweeping variations in material culture (Maschner et al. 2009), Port Moller 1b and late Sandy Dunes are temporal equivalents to the Russell Creek Phase. During the Adamagan phase, the population on Sanak increased and “sites [were] everywhere” (Maschner et al. 2009, Maschner, this volume, chapter 13). The Frosty Creek-like occupation at Port Moller was brief but intense, with large houses, elaborate burials, and a profusion of art (Maschner 2004a). The Hot Springs site was briefly occupied between 700 and 550 B.P. by what is described as an Izembek phase material culture, Hot Springs 3. During the Morzhovoi Phase Port Moller is unoccupied, a strong contrast to intensively occupied Sanak Island (Maschner et al. 2009).

In the Shumagin Islands, Johnson (1988) identified five periods of occupation. The earliest occupation following 5000 B.P. consists of a single small site (Johnson 1988, 1989), while Periods 2 and 3 are dominated by large sites. At the end of Period 3, around

3250 B.P., the islands were apparently abandoned following a series of seismic events that effectively reset the landscape. Reoccupation, after 2850 B.P., comes in the form of a small number of small settlements. Period 5, beginning around 1650 B.P., saw larger villages and populations lasting to the twentieth century.

Multiple excavations and surveys in Unalaska Bay led Knecht and Davis to propose five “basic phases . . . which combine to describe the Aleutian Tradition” (Knecht and Davis 2001). The eastern Aleutians were populated 9,000 years ago by people with a core and blade technology (Dumond 2001; Hatfield 2010, 2011; Knecht and Davis 2001) during the Early Anangula phase. Early Anangula is known from the type site off Umnak Island and two sites (UNL-115 and UNL-318) on Hog Island in Unalaska Bay (Knecht and Davis 2001:272). A Late Anangula phase attempts to link Early Anangula with the rest of the Aleutian sequence, although there remains a nearly 2,000-year chronological gap between the phases (Dumond 2001). According to Knecht and Davis (2001:273) core and blade technology, basic to Early Anangula, is present in the Late Anangula phase, along with bifacially retouched tools, stemmed projectile points, and “bell-shaped” scrapers.

The Margaret Bay phase (4000–3000 B.P.), is a unique manifestation of the Aleutian tradition. This phase is characterized by oval, stone-walled houses, elaborate hearths, floor channels, Arctic Small Tool tradition-like tools, and an economy that included hunting ice-edge faunas typical of modern north Alaska. Core and blade technology “becomes rare or absent by about 3000 BP” (Knecht and Davis 2001:276).

The beginning of the Amaknak phase, ca. 3000 B.P., was marked by a 2 m drop in sea level, prompting a shift of settlements to the new shoreline. Sites are characterized by massive midden mounds occupied into the historic period. The Amaknak phase “represents the high-water mark of the Aleutian tradition in terms of the sheer variety in lithic and bone tools.” Quality of workmanship peaks in “a stylistic exuberance evident in a plethora of barbing styles, highly decorated hunting equipment . . . and in decorative items” (Knecht and Davis 2001:278).

The Late Aleutian phase spans the 800 years prior to Russian contact, ca. A.D. 1750. Hunting technology in this phase is marked by the artifact suite described by McCartney (McCartney 1971) with new styles of foreshafts and sockets, bone harpoon points, and carved animal figurines (McCartney 1971; Knecht and Davis 2001:278–279). As on the Alaska Peninsula, longhouses appear. Unalaska-style longhouses lack side rooms and consist of two or three enormous longhouses, up to 60 meters long, connected by passages into single massive H-, L-, T-, and I-shaped structures that housed entire communities. They are distributed from the Islands of Four Mountains to the Fox Islands (Veltre and McCartney 2001).

REGIONAL PERIODIZATION IN THE CENTRAL AND WESTERN ALEUTIANS

Owing to the limited data from a few recent excavations, cultural phases for the central Aleutians cannot be formally defined. By 6500 B.P., the central Aleutians were colonized

by people using only bifacial technology (Hatfield 2010, 2011). The oldest dated site on Adak, at 6000 B.P., is ADK-171, a cockle-shell midden. Faunal remains, and lithic and bone tools are abundant, but no houses could be identified. Stone tools included a stemmed point and a drill fragment. Bone objects included awls and a needle.

This early occupation is followed by a 2,000-year hiatus, succeeded by another occupation at 3600 B.P. that continued until 1300 B.P., with sites consisting of small middens with small, single-family houses. This time period corresponds to Knecht and Davis's Margaret Bay Phase. Excavation of an upland house revealed floor channels that clearly parallel those of the Amaknak Bridge and Margaret Bay sites (Hanson and Corbett 2010). Artifacts include an array of bifaces, stemmed points, abraders, and ground stone typical of Aleutian tradition sites (Wilmerding and Hatfield 2012). Between 1300 B.P. and 150 B.P., the number and size of sites increases. Obsidian from Akutan Island signals increased contacts with people to the east. Simple rectangular longhouses, averaging 11–13 meters long, and lacking side rooms, also appear.

Because of the AEC nuclear testing program on Amchitka Island in the Rat Islands, more than 120 sites have been mapped, tested, and described. The oldest sites on Amchitka and Hawadax Islands consist of elevated, non-coastal scatters of stone tools and flakes exposed in deflated tundra exposures, called “blowouts” (Desautels et al. 1971; Funk 2010). Calibrated dates on terrestrial plant charcoal from the hearths range between 5700 and 4100 B.P. (Kent 1986).

Lithic materials include a high proportion of cherts, in marked distinction to the basalts and andesites found in later sites. A projectile point found in one of the blowouts resembled Sandy Beach Bay style points. No structural remains have been described from these sites.

At 2250 B.P., midden sites with house pits suddenly appear. In total, the limited number of ^{14}C dates show over 2,000 years of occupation—from 2250 to 180 B.P.—interrupted by frequent occupational hiatuses, which may be an artifact of archaeological survey gaps (Funk 2011a). Artifact assemblages on Amchitka reflect strong continuity with the central and eastern islands over the entire time period. During the last millennium, increasing connections to the west are evident in artifacts shared with the Near Islands that are unknown farther east. These include triangular line decorations on bone tools, asymmetrically barbed harpoons, and peg-shaped bone wedges (McCartney 1971, 1977). Late prehistoric assemblages include iron-bladed knives made from metal from Japanese ships trapped in the Kuroshio oceanic current (Desautels et al. 1971; Funk 2010; McCartney 1977). As elsewhere on the chain, longhouses were adopted in the late prehistoric period. Never common in the Rat Islands, the new house style and related social, political, and economic changes may be traced to as early as 1000 B.P., but was possibly as late as 300 B.P. (Corbett et al. 2001).

Recent research by the WAAPP on Shemya and Attu Islands confirms Spaulding's belief that the islands were colonized around 2500 B.P. (Corbett et al. 2010; Spaulding 1962; West et al. 1999). The early period of Near Island prehistory records small sites with an average of 10 houses (Corbett et al. 2001, 2010). About 1200 B.P., Near Island sites greatly expand in area and the average number of houses increases to 37, with each village also containing between one and four longhouses (Corbett 2011; Corbett

et al. 2001). In 1741, the Russians reported that Near Island chiefs occupied distinctive dwellings that combined both domestic and ritual functions (Corbett 2011). These longhouses are believed to represent chief's houses. This political and social elaboration apparently began about 400 years prior to similar developments in the eastern Aleutians.

HUMAN GEOGRAPHY AND ECONOMICS: A REGIONAL VIEW

The more than 200 islands of the Aleutian chain are divisible into several major groupings, from east to west: the Fox Islands, the Islands of Four Mountains, the Andreanof and Delarof Islands, the Rat Islands, and the Near Islands. Two small island archipelagos east of the main Aleutian arc and south of the Alaska Peninsula include the Shumagin and Sanak Islands.

Island geography defined suitable locations for human occupation and set constraints on site sizes (Aigner 1973; Bank 1953; Corbett 1991; Hrdlička 1945; Jochelson 1925; Johnson 1992; McCartney 1977; Veniaminov 1984 [1840]). Favored locales required good access to the beach for boat landings, fresh water, flat ground, a sediment cover sufficiently deep for house construction, and coastal topography that offered protection from wind and waves. McCartney estimated only 5–10 percent of the coastlines of the islands were low and accessible to people. The rest were lined with steep cliffs and slopes (McCartney 1977, 1984).

Every Aleut village was supported by the resources within its immediate vicinity, about 6 km (Corbett 1991; Veniaminov 1984 [1840]). Aleuts along the entire chain relied on an identical suite of sea mammals, fish, birds, and shellfish, with the addition of some land species, like caribou, in the east. Physical and biological variability create a rich mosaic of microenvironments that privilege and constrain human occupation. While no island used by the Aleuts totally lacks resources, the *relative* productivity of an island is probably more important for determining intensity of use. Productivity is indirectly measurable as a ratio of island coastline length to island area, its *index of irregularity* (McCartney 1977). The longer and more convoluted an island's coastline, the more attractive it was for humans. Islands with the highest index of irregularity include Unalaska, Atka, Amlia, Adak, Amchitka, Attu, and the Semichi Islands. The lowest index value is associated with volcanic cones, Carlisle, Amukta, Gareloi.

Another factor affecting productivity is the amount of shallow offshore waters, often accompanied by a rocky tidal flat, which support abundant and diverse fish, invertebrates, and algae. The lack of shallow, intertidal water resources surrounding the Islands of Four Mountains, the small islands east of Adak, and around Buldir, forced greater reliance on hunting of sea mammals and cliff-nesting birds over more abundant and reliable fish and shellfish.

Most researchers agree Aleuts occupied “stable” villages, occupied for decades, if not centuries, punctuated by briefer stays at less permanent camps. Large sites are identified as permanent, residential villages, while small sites are temporary or resource-procurement camps. The majority of sites, intermediate in size, are considered summer villages, satellite winter villages, or seasonal camps (Aigner 1973; Veniaminov 1984 [1840]; Yesner 1977). Martinson (1973) determined the complex of sites within Makushin Bay, Unalaska, was a sociopolitical unit with a central village, Makushin, at Volcano Bay, dominating permanently occupied but winter villages within the bay. Makushin residents also used satellite summer villages within the larger Makushin Bay.

Shumagin Islands

The Shumagin Islands comprise a group of 20 islands south of the Alaska Peninsula, 155 km east of Cold Bay. The largest are Unga, Popof, Korovin, and Nagai, with a total land area of 1,192 km². A total of 87 prehistoric sites are recorded (Johnson 1988, 1989), unevenly distributed with 57 on the Outer Shumagin Islands (Johnson 1992). The vast majority are villages with middens and up to 28 houses. Other site types include isolated artifacts, lithic scatters, caves, blowouts, and historic fox-trapping camps. Site locations conform to the criteria outlined above. The largest sites in the Outer Shumagin Islands are located on Chernabura and Simeonof Islands. Lacking salmon streams, the Shumagin Islanders apparently relied on sea mammals and deep sea fish for subsistence. Johnson (1989) speculates these sites may have been located for ease of access to migrating sea mammals.

Fox Islands

Beginning at Unimak Island, separated from the Alaska Peninsula by 1.6 km wide False Pass, the Fox Islands stretch 400 km west to Umnak. The three largest islands in the entire archipelago are Unimak, Umnak, and Unalaska. The small islands of the Krenitzin group lay between Unimak and Unalaska. All of these islands were densely occupied in the past.

Unimak, the largest island at over 4,000 km², is biologically, geologically, and culturally an extension of the Alaska Peninsula. The earliest known sites are less than 3,000 years old, and most date from the late prehistoric and historic periods. Over 40 prehistoric village sites occur on the island, most on the low north and east shores. The late prehistoric period on Unimak is dominated by a small number of very large sites containing hundreds of house depressions and, typically, between four and 21 large, Peninsula-style longhouses.

Seven sites with Peninsula-style houses occur in three clusters on Unimak. One comprises an enormous village at Swanson Lagoon on the northeast coast of the island. A pair of large sites centers on the western end of the island. Finally, four sites, including

Agayadan, are situated around Uria Bay along the central north coast. At Agayadan, a village inhabited from about 600 B.P. to the early Russian period, Hoffman mapped over 200 surface features, including 21 longhouses (Hoffman 2002). At contact in the 1750s, the population of Unimak may have been over 3,000 (Hoffman 2002).

Subsistence at Agayadan focused on migratory fur seals, sea lions, and, to a much lesser extent, harbor seals. Although Unimak Island has a small herd, no caribou remains were found in this excavation. Fish, the most abundant vertebrate remains, reflect reliance on lagoon species: small flatfish and salmon, with smaller numbers of cod, sculpins, and herring. Birds were a tiny component of the assemblage; most common were sea ducks and large shorebirds, also found in lagoons and along sandy coastlines, and shearwaters found in enormous numbers offshore. Though not reflected in Agayadan's assemblage, beached whales may have formed an important component of the economy of northern Unimak Island, where, in the nineteenth century, between three and 20 humpback or gray whales annually washed ashore (Veniaminov 1984 [1840]:45).

West of Unimak, the 14 Krenitzin Islands were home to a distinct political/ethnic Aleut subdivision who called themselves Qigiiun (Black 2003). At 490 km², Akun and Akutan constitute 75 percent of the land areas of the Krenitzin Islands. Most of the islands are low, with numerous small embayments. All were densely occupied. At least 60 archaeological sites are recorded, but over half the islands have had no surveys.

Most excavations have focused on large midden village sites on Akun (Holland 1992, 2001; Turner and Turner 1974). Sanagan, the oldest known site on Akun, is radiocarbon dated to ca. 5000 B.P.; and the site demonstrates strong ties to Ocean Bay 1 and Takli Alder sites on Kodiak Island and the Alaska Peninsula.

The Krenitzin Islands served a special role in funneling contacts and trade between the Aleutians and the Alaska Peninsula and Kodiak Island. Ground slate, used for projectile points and ulus, comprised 31 percent of the assemblage at Chulka. No slate sources have been found near Chulka, suggesting "trade with Eskimos at the base of the Alaska Peninsula and Kodiak Island, where slate is abundant" (Turner and Turner 1974:30). Ties to the Alaska mainland in the late prehistoric period are also seen in the distribution of longhouses. The Shumagin, Unimak, and Krenitzin Islanders all adopted the Peninsula-style longhouses with associated side rooms.

Unimak, Akun, and Akutan Passes funneled vast herds of migrating fur seals and whales past the Krenitzin Islanders. The majority of faunal remains in sites along Akun Pass, between Akun and Akutan Islands, are migratory species. The Krenitzin Islands, at present, are a center of abundance for several species of whales, including gray, humpback, blue, and fin whales. Almost never considered in archaeological or ethnohistorical discussions of Aleut subsistence, the amount of whale bone in Krenitzin Island sites, used for structural elements, fuel and tools, as well as a suite of weaponry, including ground slate points and ulus, suitable for killing and processing whales, indicates this resource was critical to the islanders. Faunal assemblages from Akun also include caribou, brown bear, and walrus, indicating close links to the Alaska Peninsula. Uniquely for the Aleutian Islands, Kodiak Island-type dogs were recovered from Chulka (Holland 2001).

On Unalaska and Umnak, site density reflects coastal complexity. With its very complex and embayed coast, Unalaska is dotted with over 150 known midden sites covered with house pits. Multiple sites within Unalaska Bay, Makushin Bay, and Beaver Inlet appear to form tightly integrated communities in the late prehistoric period. By contrast, Umnak has a low index of irregularity that contributed to markedly lower site densities. Historically, 20 large villages were arranged around the coast of Umnak. The western end, with its more complex and embayed coastline, supported half the villages known for the island.

During the Late Aleutian Phase (ca. 1000–200 B.P., A.D. 1000–1800), sites on Unalaska and Umnak were dominated by Unalaska-style longhouses. Peninsula-style longhouses are found on the northeast coast of Unalaska Island, supporting Black's (1984:45) contention that Krenitzin Islanders were moving west.

Economically, the hunt for marine mammals was the predominant focus, (Denniston 1974; Laughlin 1974–1975, 1980; Yesner 1977). Rocky tidal flats offshore provided the shellfish (mostly sea urchins) that served as a crucial foundation for Aleutian sedentism, cultural complexity, and human longevity (Laughlin 1974–1975, 1980). Since 1960, the Chaluka-based paleoeconomic model has provided the standard interpretation, untested and probably over-idealized, of Aleut settlement patterns as a seasonal round extending from a permanent residential village, with alternate, subsidiary or seasonal camps, some very ephemeral (Aigner 1973; Laughlin 1974–1975; Martinson 1973; Yesner 1977).

Islands of Four Mountains

The Islands of Four Mountains are a group of eight small volcanoes, some joined, due west of Umnak Island, with a total land area of 546 km². These emergent mountain peaks have very low indices of irregularity, lack embayments, low-lying shorelines, fringing reefs, and shallow inshore waters for fish. Many islands lack surface water of any kind except ephemeral streams. The Islands of Four Mountains should be depauperate but the islands cliffs are alive with nesting seabirds, and the waters teemed with sea lions and whales. The former inhabitants were whalers of renown (Black 2003; Veniaminov 1984 [1840]). Archaeological surveys in the 1980s recorded 23 settlements on seven of the islands. No village sites have been excavated. Peninsula-style longhouses, up to 25 m long, were likely introduced in the late prehistoric period. The prehistory of the Four Mountain islands is based on poorly reported analysis of fragile, perishable materials from burial caves plundered by collectors before the mid-twentieth century (Dall 1877; Hrdlička 1945). In spite of the uniqueness of these artifacts, they have not been adequately described (Dove and Peurach 2002; Hrdlička 1945). Spruce roots, birch bark, and caribou, and other fur and hair, record close economic ties to the Alaska Peninsula and beyond. Gulls, auklets, and shorebirds contributed 63 percent of the feathers used in textiles found in the caves, with ducks and geese, cormorants, and songbirds contributing the rest (Dove and Peurach 2002). Fur came from seals and sea lions (52 percent),

otters (20 percent), bears (13 percent), dogs (11 percent), and caribou (2 percent) (Dove and Peurach 2002). Wood artifacts bear stylistic similarities to objects from the southern Alaskan mainland (Black 2003).

Isotopic analysis of human burials from the caves has added significantly to our understanding of resource use in this island group (Byers et al. 2011; Coltrain et al. 2006). All the burials are younger than 1000 B.P. Up to 35 percent of their diet was made up of sea lions and whales, with another significant percentage made up of open water fish species. At Chaluka, by comparison, isotopic signatures show a 20 percent reliance on pinnipeds.

Andreanof Islands

The Andreanof Islands, extending westward 500 km from Amukta Pass to Amchitka Pass, consist of two clusters of large islands—Atka with Amlia, and Adak, Kanaga, and Tanaga. Fourteen small, extremely steep and rugged islands lie between Atka and Adak. Southwest of Tanaga, the Delarof Islands consist of seven small, low, and accessible islands. The total land area is 3,925 km². The islands most suitable for human occupation include Tanaga, Kanaga, Adak, Atka, and Amlia.

The larger Andreanof Islands possess crenulated shorelines with a multitude of bays. Every location suitable for house construction contains village sites, with the size limited by the space available for building. Large sites dominating bays on Atka, Adak, and Tanaga suggest social systems similar to that described for Makushin Bay on Unalaska. The small islands east of Adak were sparsely occupied and apparently politically and economically dependent on larger communities on the neighboring islands. The Delarof Islands, southwest of Tanaga, are small with simple and straight coastlines, but rich in seabird colonies, rocky reefs, and sea mammal rookeries. Sites are numerous on the Delarofs and were only slightly smaller than those on nearby Tanaga Island.

The dominant view of Aleutian archaeologists, especially Laughlin and his students, is that Unangax land use was focused on island shorelines, with little or no use of inland areas. Occasional reports of inland or upland sites prompted surveys beginning in 2007, and to date over 20 sites have been recorded on the western part of Adak Island with others on Rat, Amchitka, Kiska, and Tanaga Islands (Hanson 2010). Inland, noncoastal sites contain between two and 22 small house depressions, but so far have lacked extensive midden deposits. As yet, little evidence suggests site functions, but possible uses include lookouts and fortresses, hunting camps for waterfowl and eggs, and plant-gathering sites.

Rat Islands

Amchitka Pass, 97 km wide, separates the Rat Islands from the Andreanof Islands. The nine islands in this group span 290 linear km and total 935 km² in area. Amchitka,

Kiska, Little Kiska, and Hawadax were the most important for Aleut occupation. The five smaller islands lie in an east-west line north of these large islands, forming a large “inland sea” of relatively protected waters. Site types in the Rat Islands include large and small village middens, camps, nonmidden sites, isolated features, lookouts, and burials (Funk 2010). The relationships between these site types, and socioeconomic links between islands, have only recently attracted scientific attention (Funk 2010).

A 450-year-old house from RAT-032 is one of the few fully described dwellings in the Aleutians (Cook et al. 1972). The house matches ethnographic house descriptions, with a roof entry, a shallow trench along the interior walls, and floor pegs suggesting internal partitions. Artifact distributions suggest a family with two adult women, an adult male, and at least one child, lived in the house. Subsistence in the Rat Islands was broadly based on the triad sea lions, seals, and fur seals, as well as sea otters. Compared to the eastern Aleutian Islands, the numbers of mammal bones found in sites is limited. On Amchitka a sample of 1,300 mammal bones showed sea otter predominated (57 percent), followed by harbor seal (32 percent), sea lion (6 percent), and fur seal (2 percent) (Desautels et al. 1971). At least some of the sea lions and fur seals were “extreme juveniles,” indicating hunting at breeding rookeries (Corbett et al. 2010; Crockford 2012; Funk 2010). Two ribs from Steller’s Sea cows have been recovered from Aleut middens on Kiska Island (Lech et al. 2012). Fish remains are abundant. Most of the fish species recovered are typical of the near-shore environment, cod, halibut, rockfish, greenlings, and Irish Lords. A focus on bird remains has dominated recent analysis (Bond and Brake 2008; Causey et al. 2005; Funk 2010). At least 26 bird taxa have been recovered. Alcids, a group which includes least, crested and whiskered auklets, marbled and ancient murrelets, puffins, murres, and guillemots, are the most commonly recovered birds. Cormorants, gulls, ducks and geese, albatrosses, fulmars, and shearwaters follow in abundance. Much less common are a miscellany of petrels, loons, grebes, ptarmigan, sparrows, ravens, and eagles.

Invertebrates, overwhelmingly dominated by sea urchins, were an important but often discounted, component of the Aleut economy. Volume of sea urchin shell in midden ranges from 0.4 gm to over 400 gm per liter of midden soil (Corbett et al. 2008).

Buldır Island

Buldır Island splits the widest interisland pass, 225 km, between the Rat and Near Islands in half. Abundant lithic tools show affinities to both the Rat and Near islands. During the most recent occupation, a Near Island-style chief’s house, constructed of whale mandibles and ribs, asserted Near Island dominance over the island (Corbett 2011). Wet, anaerobic conditions preserved wood, leaves, and eggshells in outstanding condition. Wooden artifacts included platforms and spindles for bow-drill fire-starters, model kayak parts, projectile points, and wedges (Corbett 1994). The subsistence focus was on sea lions. Colony-nesting seabirds were important supplementary resources, possibly hunted for their skins and decorative feathers to be used in clothing. Fish were rare, and shellfish virtually nonexistent (Lefèvre et al. 1997; Lefèvre et al. 2001).

Near Islands

This is the smallest and westernmost group of the Aleutian Islands. The largest, Attu, is the fifth largest island in the chain. The total land area of the five Near Islands is 1,144 km².

Colonization of the Near Islands coincided with a period of diminished storm activity and lessened rainfall around 3200 B.P. The first substantial settlements are Krugloi Point on Agattu Island (Spaulding 1962) and ATU-061 on Shemya at 2500 B.P. (Corbett et al. 2010). Within 500 years of the initial occupation, all of the known sites on Shemya were occupied. A similar expansion of occupation is assumed for the other islands in the group. These early sites were relatively small, with an average of nine houses. The distribution of sites around the shorelines suggests defined territories for each community, and guaranteed each settlement access to a wide range of resources (Corbett et al. 2001, 2010; Lefèvre et al. 2001).

Late Prehistoric sites are dramatically larger and more numerous than earlier sites. The number of house pits per site increased to an average of 30. At the same time, one to four longhouses, up to 18 meters long, appeared. The appearance of these longhouses at about 1200 B.P. marks the earliest evidence for the development of complex social and political structures from the Aleutian Islands (Corbett 2011; Corbett et al. 2001, 2010; West et al. 1999).

As elsewhere in the archipelago, subsistence was based on exploitation of sea lions, seals, and fur seals. Fur seal pups indicate the presence, and exploitation, of breeding rookeries in the past. A broad spectrum of whale species is represented in sites, from small porpoises to small baleen whales (Corbett et al. 2010). In early sites on Shemya Island, bird remains were dominated by colony-nesting alcids, puffins, and murre. By 2,000 years ago these had given way to pelagic species such as short-tailed albatross and shearwaters. The likely cause is overexploitation of the breeding colonies on this small island (Corbett et al. 2010). Birds were used as food and also hunted for skins used in clothing. Fish remains comprised up to 52 percent of the faunal remains, including invertebrates, recovered. The assemblage was dominated by Pacific cod, and Scorpaeniformes—the rockfish, greenlings, and sculpins (Corbett et al. 2010). The invertebrate fauna was dominated by sea urchin, whose shells composed up to 60 percent of the midden volume (Corbett et al. 2008).

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CHAPTER 26

CONTACT AND POSTCONTACT IÑUPIAT ETHNOHISTORY

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THE regional late precontact Iñupiat cultures of northern and northwestern Alaska developed directly from Late Western Thule roots (Burch 1998, 2003, 2006, 2007; Jensen 2009, this volume, chapter 21; Sheehan 1990, 1997; Spencer 1959). Europeans, primarily Russians or those in their employ, reached southwest Alaska by 1741, concentrating on fur trading, particularly for sea otter pelts. Trade goods reached Alaska before that through trade fairs along the Siberian coast. The Russians initially followed the Aleutian chain, establishing their first permanent base on Kodiak in 1784. The people of north and northwest Alaska were relatively unaffected by early Russian activities, which were focused on species not found in the north. Establishment of a mainland Russian station in Saint Michael in 1833 on the southern shore of Norton Sound (Ray 1975:122–123) provided the northerners with easier access to trade goods, as did the presence in Canada of Hudson's Bay Company traders with goods brought down the Mackenzie River and traded west into Alaska (Simpson 1855).

DATA LIMITATIONS AND CHRONOLOGICAL PARAMETERS

Archaeologists often presume that site survival increases toward the present, and therefore the known database also increases toward the present. In the Iñupiat region the contact period database is comparatively thin, especially for the early nineteenth century. This reflects a field research bias, so for example only limited data acquisition occurred at the large Tikigaq mounds near Point Hope (Larsen and Rainey 1948:14)

and in the upper levels of Kukulik on St. Lawrence Island (Geist and Rainey 1936:57). Both sites nevertheless yielded abundant and reasonably well-dated late nineteenth-century assemblages; however, analyses and syntheses for both areas remain preliminary. Nineteenth-century houses or middens have been excavated at Point Hope, Point Thompson, near Point Belcher, at Utqiaġvik (Barrow), Nuvuk (Point Barrow), Birnirk (base of Point Barrow spit), and Walakpa (south of Barrow) (Ford 1959; Jensen 2009; Stanford 1976).

Notable excavations in nineteenth-century houses or middens include those of Shinkwin (1977) at Point Hope, Hadleigh-West (1961, 1966) at Point Thompson, Cassell near Point Belcher (2000, 2005), a large team at Utqiaġvik (Kilmarx 1990, Lothrop 1990, Newell 1990, Reynolds 1990, Sheehan 1990, T. Smith 1990). In addition, nineteenth-century components were encountered during the course of larger projects at Birnirk, and Walakpa (Ford 1959; Stanford 1976), and at Nuvuk, described in Jensen (2009).

Chronological control in the historic period poses special problems for archaeologists. Although ^{14}C dating is of limited precision, trade items provide datable inferences when materials such as trade beads, manufactured metal or milled lumber are encountered. In northern Alaska, European beads precede the direct presence of Europeans by up to 200 years. Many Western trade items were introduced to the north after they had lost popularity in their original markets, including firearms and other hunting gear. Sparse archaeological survey and excavation data for the nineteenth century has an exception in the provisioning of shore-based Yankee whaling stations at Point Belcher.

SETTLEMENT PATTERNS

The late precontact settlement pattern was comparatively well established through the efforts of Ford (1959), Foote (1965), Ray (1975) and Burch (1998, 2005, 2006, 2007). Most inhabitants of the Alaskan Bering and Chukchi coasts lived within winter villages with a few hundred inhabitants, often in paired settlements where related families' residences were clustered into what Harritt (2013) has called "kindred compounds," a pattern which persists at present to some degree. The major villages were located adjacent to resource hotspots in areas of high marine productivity (Dunton et al. 2014), along bowhead whale migration routes (Quakenbush et al. 2012), or associated with walrus haul-outs (Hill 2011): Sivuqaq, Kukulik, and Kiyaliqaq on St. Lawrence Island; communities on King and Sledge Islands, off the Seward Peninsula; Kawerak, Wales, Shishmaref, Point Hope, Icy Cape, Point Franklin, and around Barrow. Dispersed small settlements were situated at the heads of bays, and strung along fish-bearing rivers.

Population likely reached its precontact maximum in the few generations prior to contact with the West, ca. A.D. 1750–1800 (Sheehan 1995:191). As populations grew, family groups created permanent homes wherever the local hunting could support them *sans* whales, since they could still travel to the main villages for whaling season and a

share of that critical harvest (Burch 2005, cf. Jensen, this volume, chapter 21). People living in and near the Brooks Range gradually spread eastward, with the Anaktuvuk Pass area first being used by Iñupiat by the 1860s (Hall 1975).

Inlanders, people who primarily hunted caribou and as a result were relatively mobile, had close ties to coastal people. In the 1850s, the people who lived at Nuvuk, Point Barrow, told Captain Maguire that the inlanders were the original Nuvukmiut, indicating the strong ties, including familial, between the two groups (Maguire 1988). Inlanders added significantly to the trade network, primarily by contribution of caribou skins and other caribou products. As Hall (1971) noted, each person needed about eight new skins a year for clothing and sleeping, and whalers' schedules did not allow enough time to obtain them during the best season. For their contributions, inlanders received skin pokes of seal and whale oil, critical for making their caribou meat a complete diet (Sheehan 1997; Stefánsson 1914).

As the population of the North Slope region dwindled, people gradually abandoned coastal satellite settlements in favor of the whaling communities, despite the villages' reputation as sources of disease. This makes sense if the satellite communities were occupied only because the limits of the general (non-whale) subsistence available in the whaling centers were reached as population grew. It became possible again for almost all coastal people to live in whaling villages and still support themselves with the full panoply of subsistence species.

TECHNOLOGY AND SOCIAL STRUCTURE

Precontact Period

The technology used during this period remained essentially the same as that used earlier in the region, although the gradual incorporation of European goods and materials tracked availability. Iñupiat technology at the time of contact was the most complex of any documented hunter-gatherer group (cf. Murdoch 1892). Almost every tool was a composite one, made of multiple materials.

Warfare: Causes and Frequency

As Burch (1974, 2005, 2006, 2007) demonstrated from oral historical accounts, peaceful relations were not infrequently interrupted by warfare. Complex systems of alliance developed throughout north and northwest Alaska, centered on the largest settlements at Point Hope, Wales, Point Franklin, and Barrow. Raids took place between Chukotka and Alaska, between coastal villages, and between Iñupiat and Athapaskans. The same people most of the time had relatively good relations and often participated in inter-settlement feasting and ceremonies, such as Kivgiq (Messenger Feasts).

The reasons for warfare remain contentious: Sheehan (1995, 1997) argued that warfare became more intense as populations increased and available and exploitable new catchments became scarce. Quantifying warfare is hindered by poor chronometric data and limited demographic information. Evidence of defensive armor is greatest in the sixteenth and seventeenth centuries (Mason 2012). The precontact Mound 34 qargi (ceremonial center) in the village of Utqiaġvik (today's Barrow) was burnt, and slats of antler body armor were scattered around, on and in the structure (Sheehan 1990). Some women's parka hoods still exhibit a peak that distinguishes them from men, originally an attempt to signal raiders not to kill them.

The abandonment of the precontact village on Point Franklin, Pingusugruk, seems to have resulted from its location between larger whaling populations to the southwest, Tikigāq on Point Hope and Qayaiqsigvik on Icy Cape, and to the northeast, the Utqiaġvik and Nuvuk settlements. Actual large-scale warfare (as opposed to feuding) seems to have ended as the population declined from diseases and battles that preceded direct contact with Westerners. Burch (2006) records the last major battle near Point Hope as taking place in the very early 1800s, not long before first contact, with approximately 200 fatalities. The increased availability of Western trade goods and concomitant increase in trading activity also appears to have played some role in the end of warfare (Burch 2006).

POSTCONTACT PERIOD

Contact did not lead to political or cultural submission of the Iñupiat. It did lead to social changes, diminution of traditional trade networks in favor of direct trade with ships and shore stations, and changes in architecture that continue into the present.

Explorers and Iñupiat

The Russian Billings Expedition of 1791 contacted mainland Iñupiat before 1800 (Burch 1998; VanStone 1977). Subsequently, Westerners began entering Iñupiat areas more often, still not establishing a long-term presence. The 1833 establishment of the St. Michael trading post near a traditional trading center (Burch 2005) set a pattern for locating some later trading posts.

The first recorded visits of non-Natives to the North Slope occurred in 1826, by an expedition led by Captain Frederick W. Beechey of the Royal Navy, who commanded HMS *Blossom* (Beechey 1831). Their goal was to rendezvous with a party from Sir John Franklin's expedition believed to have proceeded west from the Mackenzie River. Franklin's party did reach west of Prudhoe Bay as far as Return Island before turning around (Franklin 1828). Although Beechey and *Blossom* did not make it past the aptly named Icy Cape and the nearby Blossom Shoals, *Blossom's* barge did

reach the village of Nuvuk at Point Barrow. The Nuvukmuit's aggressive behavior intimidated the party (Peard 1973:162). Although no Western vessel had visited Point Barrow previously, the residents chased it off, treating it as just another war party from the village of Tikiġaq.

Exploratory travel with minimal contact with the Iñupiat continued up through the 1850s, with trips by Simpson and Dease in 1837 (Simpson 1843) and, by kayak, the Russian Kashevarov in 1838 (VanStone 1977). Kashevarov succeeded in calculating a latitude for Point Barrow (VanStone 1977:36), and followed the coastline east and south past Plover Point. The early 1850s saw trips by Moore in 1849 and 1850, Sheddon in 1849, McClure in 1850, and Collinson in 1851 and 1854.

Captain Maguire's observations, rescued by Bockstoe (Maguire 1988) from over a century of oblivion, plus the ship's physician's report to Parliament (Simpson 1855), record our best and most comprehensive view of a relatively undisturbed early historic coastal whaling community, one that apparently had suffered little impact from European diseases.

Whalers and Traders

The situation altered significantly for the Iñupiat in 1849. Yankee whalers had virtually extirpated the southern stocks of bowhead whales. Captain Thomas Welcome Roys sailed through the Bering Strait to whale in the Chukchi Sea. Whalers depleted Chukchi whale populations in the 1850s, then shifted to the Beaufort Sea. Within a decade, Euro-Americans established shore-based whaling stations (Allen 1978; Brower 1942) and induced local residents to participate in the commercial whaling industry. Many Iñupiat, particularly from southern areas, were hired onto whaling ships, as hands or to assist with hunting and skin sewing for crew's clothing. This was the first experience of wage labor for the Iñupiat. Those employed in Yankee whaling had direct access to Euro-American trade goods, while others obtained them through the traditional trade fair network, or from trading posts set up along the coast by traders.

The first non-Native to permanently settle in Barrow, Charles Brower, arrived in 1886, founding the Cape Smythe Whaling and Trading Company. Brower and his numerous offspring with his second Iñupiaq wife further developed the established tradition of facilitating science, meeting with and assisting visitors to the village and the trading post. These included Vilhjálmur Stefánsson, Knud Rasmussen, Diamond Jenness, the Lindberghs, and many others.

Whales initially were targeted primarily for the oil from the blubber. When the discovery of oil in Pennsylvania in 1859 reduced demand for blubber, trade in baleen continued to support the industry. Collapse of the baleen market and the depletion of the whale stocks ended commercial whaling around 1916 or 1918 (Spencer 1959; Stefánsson 1913, 1914). Local whaling continued throughout this period of disruption. Stefánsson (1913) documented that deaths in Barrow were made up by non-Barrow Iñupiat moving into the village and joining whaling crews.

TRADE AND EXCHANGE IN NORTHERN ALASKA

The extensive traditional Native trading network operating throughout the North preceded the Russians. Goods like tobacco, iron, copper, and beads (Murdoch 1892; Jensen 2012; cf. Jensen, this volume, chapter 21) reached the region possibly centuries prior to the arrival of the Russians. When Russian traders set up the trading post at St. Michael, and as goods came down the Mackenzie River and west into Alaska, the flow of nonlocal goods into the trade network accelerated (Simpson 1855). Iñupiaq transitioned from the autonomous zone of the world-system to the contact periphery, then rapidly to the marginal periphery and then the dependent periphery, as at present (Friesen 2013). This sequence is reflected in the Utqiagvik stratigraphy of superimposed houses (Hall and Fullerton 1990).

Presumably, most of the precontact European and Asian goods came in trade from Chukotkans, who in turn obtained them by trading. Some came from the east, from Canadian trading partners (Maguire 1988). The first gun arrived in Nuvuk in the early 1850s from Canada, as recorded by Captain Maguire (1988), at a time when the umialiit (Inupiat whaling captains) of Nuvuk were still reluctant to trade tobacco east into Canada. Other items, such as jade, walrus (from hunting and from beach or erosional finds), and mammoth ivory and beaver teeth apparently also were traded through this network. The archaeological similarity in material culture between some inland Eskimo and some Indian sites in Alaska (cf. De Laguna 1947) suggests that some trade goods also made their way north through Indian-Eskimo interactions.

Trade fairs were known to have taken place at Sisualik in Kotzebue Sound (Burch 2005; Nelson 1899; Ray 1975; Stefánsson 1914), Point Spencer on the Seward Peninsula just south of Bering Strait (Burch 2005; Ray 1975), at Pigniq between Nuvuk and Utqiagvik, Nigliq near the mouth of the Colville River (Maguire 1988), and on Barter Island, as well as at the mouth of the Mackenzie River. The Sisualik fair is reported to have moved to the current location of Kotzebue in 1884 (Burch 2005). Point Spencer and the Kotzebue location of the Sisualik fair drew interest from Euro-American whalers and traders, with Point Spencer becoming a coaling station for the American whaling fleet (Aldrich 1889; Burch 2006). Trading was generally peaceful (although see Lebo 2006) and its expansion with the arrival of Euro-American traders seems to have contributed to the cessation of the endemic warfare across northern Alaska.

In the stratigraphic record, tidy near-surface archaeological excavation with straight trench walls suddenly becomes much more difficult at a deeper and uniform layer in the Utqiagvik middens, below which baleen is much more plentiful, sticking out in every direction. This layer coincides with the time at which the Iñupiat whaling captains realized that trading baleen to the ships resulted in great payoffs. By dropping the use of baleen for fish nets, fish lines, bucket walls, bird snares, wolf scarers, and all of the other items traditionally fashioned from this product of the whale hunt, people

gained access to an enormous quantity of new trade goods. These goods included everything needed to replace the items formerly made from baleen, as well as guns and ammunition, playing cards, tea and sugar, and eventually whaling gear, including the 1870s technology for taking whales that is still, by international treaty, used today in the subsistence bowhead whale hunt (International Whaling Commission 2008; Jensen 2012).

Trade in beads is also obvious in stratigraphic context, ranging from precontact levels, with at most a few probably locally made clay beads per house, to a house with a few blue glass beads, to historic houses with fair numbers, sometimes dozens, of glass beads (Bockstoce 1979; Giddings and Anderson 1986:57; Sheehan 1990, 1997:121–123).

Architecture

The domestic architecture of the Late Western Thule did not change in any essential details until the late nineteenth and twentieth centuries. Traditional houses built in the precontact period and well into the contact era were very similar. Archaeologists have better documentation of more recent houses, in large part because more of them have been excavated with modern scientific techniques (cf. Stefánsson's techniques at Birnirk as reported by Brower (1942:244) and Stefánsson himself (1913) in contrast to more recent work at Utqiaġvik (Hall and Fullerton 1990), Walakpa (Stanford 1976), or even Ford's work at Birnirk (Ford 1959). Architectural changes in response to availability of Western materials and tools are readily documented with contemporaneous written accounts, drawings, photographs, and experiences of living people.

The evolution of house forms from late prehistory to the present is clarified by the stratigraphic sequence of houses at Utqiaġvik and Pingusugruk, as well as along the Cape Krusenstern beach ridges (Giddings and Anderson 1986) and by historic accounts (Brower 1942). Standing and partially standing houses complete the picture at Atanik, the old "Tigara" townsite at Point Hope, and other locations.

Winter Houses

The following description of winter house form and function is based on Bockstoce (1979), Giddings and Anderson (1986), Hall and Fullerton (1990), Ford (1959), Sheehan (1990), Sheehan et al. (1991), and Stanford (1976). Traditional houses were approached through long tunnels that sloped to their deepest point at or under the front of the house. In whaling settlements, a whale skull typically served as the first step into the tunnel or was otherwise incorporated into the entryway. One at Pingusugruk served as a convenient cache for small items. Entry to the house was through the *katak*, a hole in the wood floor, (or the slanting front wall further south, as at Pingusugruk), up through which individuals pulled themselves. The deepest point of the tunnel also served as a

cold trap. People left their clothing there, so breath frozen on furs never melted and clothing retained its insulating properties. Tunnels tended to be deeper in more northerly settlements.

The long axes of houses generally ran north-south, with the tunnel extending south from the front of the house. The longest pitch of the roof faced south, and the roof had a gut window that could be propped up from below by pushing it up with a specially formed stick. In the southern part of the region, house orientation was more variable, but the tunnel usually extended toward the ocean.

The heat in the houses was provided entirely by body heat and one or, in some cases, two stone lamps. The lamps were shallow bowls, often made of soapstone traded in from Canada. A wick ran along a flat rim of the lamp, with the deeper part serving as a reservoir of whale and seal oil. A piece of blubber was hung over the lamp, the heat from which was sufficient to melt oil from the blubber, thereby replenishing the reservoir. As debris from wrecked ships became available, along with Western trade goods, lamps were sometimes replaced with iron kettle bottoms, as in a house at Pingusugruk. Temperatures were reportedly in the 30s Celsius in these houses.

A similar lamp was employed in a fireplace in the kitchen, for cooking and light. The kitchen also had a driftwood fireplace. Some kitchens had distinct flues. At Utqiagvik Mound 34 (Sheehan 1990) and Pingusugruk the flues were whale skulls, with the blow-hole serving as the chimney. Kitchens were built off the tunnel, and not part of the house proper. The abundance of sea-mammal oil and the relative scarcity of driftwood are documented in the relative lack of wood ash in the kitchen middens, the significant layered buildup of dripped and spilled oil inside the kitchens, and the oily soot everywhere in the kitchens.

In more southerly parts of the region the kitchen disappeared and heating and cooking functions were sometimes combined into a central wood-fired hearth in the main room of the house (e.g., Giddings and Anderson 1986:42–43, Harritt 1994; Larsen and Rainey 1948:48–49). Presumably this was a response to the relative abundances of wood versus whale blubber for fuel.

The coming of the Yankee whaling fleet, starting in the 1850s, provided alternative raw materials for the Iñupiat. By the 1870s, large numbers of the New Bedford whaling ships were lost in the ice along the Arctic coast. Ship's wood was sometimes employed for house construction and for fires, replacing the use of driftwood. The milled planks saved considerable labor. Otherwise useless cabinet doors were used for the kitchen fires, with metal hinges left behind in the ashes. These houses grew larger, either because it was easier to not trim the large planks, or just because their size exceeded that of the planks that could be made from driftwood. In some cases, ships' canvas was used as a floor covering, a new addition to an otherwise entirely traditional house.

While the houses, minus insulating sods, looked like any timber structure with good solid joins, kitchens were deliberately built to be drafty, employing significant quantities of bone and leaving many gaps. They were covered with two layers of sod, the inward layer grass down, the outer layer grass up. Despite the fireplace flues, the inner sods were completely covered in oily soot.

Tending lamps typically was women's work. Only women worked in the kitchens, and house lamps were placed on one or both sides of the katak, with the front of the house the women's area. Women generally were excellent lamp tenders, so excavated house interiors do not show accumulated soot. The window could vent smoke if needed. The back of the house was where the men slept and worked. The floor stopped at the point in the back where the raised platform began. Platforms were supported by wood or bone. In one Pingusugruk house, whale phalanges served as upright platform supports. Sleeping skins and works in progress were stored under the platforms.

Houses were not cluttered. As Reinhardt and Dekin observed (1990), most house floors provided for one or more small caches below the floor. Kitchens were more difficult to keep completely clear, as most were dome-shaped, making the periphery hard to reach. Caches also were maintained along the sides of the tunnels. Tunnel floors tended to be clean, because each summer they were filled with surface water from snowmelt and rain, which froze quickly because of the depth of the tunnels. To regain entry, the ice in the tunnel had to be chopped out at the end of every summer, taking anything on the floor out with the ice.

Construction and Reconstruction

Reanier (1990) determined that the original mounds used for house construction in Utqiagvik were on natural relief of ca. 10 cm above the surrounding tundra. Over time, with periodic renewal of roof sods and of the top courses of the sods piled against the walls, the mounds grew in vertical elevation. Sods that had lost their insulating qualities were removed and tossed aside, growing the mounds. When houses were abandoned, the roof sods were tossed to allow access to recycle the roof planks, and wall sods were loose enough to allow rocking the wall planks until they snapped at the frost line. Succeeding houses typically had their floors built above the old floors that were frozen in place.

This pattern continued into the historic period. Substitution of introduced materials for those obtained locally became more common. One otherwise traditional 1890s house in Utqiagvik had a tunnel with an entryway vault made from a pickle barrel (Sheehan 1990). Houses from this period contained playing cards and even grammar school primers, while the ones below them had fewer trade goods and no "exotic" construction materials. By the early 1900s, single-side pressed audio records were found, along with discarded firearms, brass spyglasses, and items apparently made for trade with crews of passing ships.

Charles Brower brought the first Western-style houses to Barrow for the use of residents. These were prefabricated for his trading company and offered to the Iñupiat whaling captains who had agreed to whale for Brower. A small number of them were brought up by ship in the 1890s and set up on the grounds of the Cape Smythe Whaling and Trading Company. One is still in use in Barrow, albeit at a different location, and one has been dragged many miles over the tundra to a camp.

In the archaeological record a transition from traditional precontact materials to imported historic materials used to make precontact forms is followed by gradual abandonment of older forms. Tunnel entrances were replaced by surface entrances sporting built-up qannitchat (Arctic entryways), while sod insulation continued everywhere. By the 1920s and 1930s, fewer and fewer tunnels were in place. Surface entrance houses with wall sods but without roof sods were eventually replaced by surface entrance houses with wall sods that rose only halfway up the sides of the walls. The last one of these partly sodded houses in Barrow was occupied by a widow who left for the Pioneers Home in Anchorage in the late 1970s. A crew of archaeologists pulled out and measured every sod. It is not apparent when sleeping platforms were abandoned, although the construction of Western-style houses would not have encouraged their continued use.

Racks for storing meat and equipment were built behind (roughly to the north of) the precontact houses. They continued into the historic period. Umiaqs, with their skin covers and sinew and rawhide bindings, and, of course, many other items, were doomed if dogs could get at them, and thus had to be stored on these racks.

Heating Houses, Sustainable Reuse

Large supplies of fuel were available before contact, primarily from whale blubber. Well into the historic period this was still the case, although the blubber was procured differently. When Iñupiat signed with Yankee whalers, they sometimes had no opportunity to whale for themselves and relied upon access to some of the carcasses that the ships discarded after the baleen was removed. The Yankee-induced crash of the bowhead whale population further reduced opportunities to obtain fuel. By the 1950s, perhaps earlier, people were forced to seek out archaeological deposits of whale oil, typically where house racks had once been located. They dug up this oil-indurated soil to burn in stoves for heat and cooking.

This fuel harvest had an untoward effect on the archaeological integrity of the locations where it was dug. The recent near-surface disturbance created by the fuel quest can be contrasted with an older type of disturbance seen in other grassy locations near house mounds. These are sod-cutting areas, where house sods were obtained for new construction and for replacing old roof sods and upper courses of wall sods. Recently these locations are less apparent thanks to increased ATV traffic. Often the roof and wall sods of a house hold much older artifacts than represented by the age of the structure. Sods from an 1890s house can hold precontact artifacts, since the sods are cut from earlier deposits.

When fuel was sufficient, Western-style houses were heated to the same level as had been their semisubterranean predecessors. The traditional houses drew moisture from their roof and wall sods and from the permafrost under the floors, but the newer-style houses were lacking in humidity. The Alaskan Arctic is a desert and the result of heating these houses was to further dry the air, with unfortunate health effects.

Reuse has been an ecological imperative and cultural tradition throughout Iñupiat history. Examples include reuse of house timbers for new construction, reuse of slate

whaling harpoon endblades for ulus (Sheehan 1990:278–279), salvage of abandoned and wrecked ships and their contents, salvage of whale-oil indurated soil for fuel, and reuse of historic houses by moving them to new locations. In addition, the lack of significant amounts of skin clothing or old boat covers in the archaeological record indicates their reuse as dog food.

In the late 1800s and well into the twentieth century, people used expended shotgun shells to tip arrows for hunting birds, instead of carving blunt arrowheads from antler or bone. Since contact, whale and walrus bone from archaeological sites has served as raw material for crafts.

Qargiich and Ice Cellars

Qargiich (sing. qargi), which are communal structures associated mainly with ceremonial and men's activities, are not archaeologically documented in significant numbers, although they are described in a variety of historic sources. The one relatively intact prehistoric qargi that was completely excavated in the region was symbolically constructed, representing a whale through elements both visible and buried (Sheehan 1990, 1997).

At Nuvuk the traditional qargiich were still in place during the *Plover's* overwinterings (Maguire 1988). In Utqiagvik, after these ceremonial centers were dispensed with under the prodding of missionaries, outdoor dancing continued into the 1910s. The social structure that these centers represented continues up to the present. Umialiit continue to host feasts for their communities, they continue to support their crew members and the crews' families during whaling, and they continue to distribute food throughout the year during holidays. The whaling captains continue to provide food for Elders and those who are unable to hunt or do not have hunters providing for them. The main physical structure today that implies this redistribution is the large ice cellar maintained by each umialik. These are dug into the permafrost, with ladders necessary to climb down into them. In recent years new cellars are sometimes dug near the owner's house; this was rarely the case in the past.

The architectural history of ice cellars is not clear from the archaeological record. Eight hundred years ago a little girl was buried in a small subsurface cache (Zimmerman et al. 2001) that would have held food enough for only a single family. Good descriptions of early contact caches or cellars are lacking. One meat cache was briefly pedestalled in a washout at Sinigagruaq before it also washed away. It also was not large and appeared to be precontact. At Walakpa, as of this writing, a substantial precontact cellar (at least two meters across) is eroding into the Chukchi Sea.

Tents and Summer Travel

Although semisubterranean houses had to be vacated in the summer as the tunnels filled with water that then froze, villages were not abandoned. Maguire (1988) observed

the mass exodus of people from Nuvuk each spring after whaling and before the land-fast ice disappeared, but not everyone departed. Some older people and young children stayed behind, along with at least some hunters. Today, while people do not leave town to trade with other northern residents, many people go scores of miles to summer fishing and hunting camps. At Pingusugruk, one of the precontact houses had an outdoor cooking hearth up against the sod wall. The hearth showed many years of use, suggesting that some members of the household routinely summered in the village, tenting next to their houses.

Tent rings, mostly undated although not undatable, abound on the ground surface in the Iñupiat region. Tent platforms (permanent wooden or gravel floors over which tents are erected seasonally) are less common on the modern ground surface, but seem to be relatively common at shallow depths, as seen in the several identifications in the Utqiagvik reports (Hall and Fullerton 1990) and at Walakpa (Stanford 1976).

Gender and Family Relationships

Multiple wives were known amongst the contact and early historic Iñupiat (Stefánsson 1919). Only umialiit seemed to see any value in acquiring additional wives, and their original wives often saw less, as their rule of the women's side of the house was sometimes responsible for the early deaths of the junior wives (Maguire 1988). No one has suggested and demonstrated archaeological evidence for these relationships, indicating the need for archaeologists to dig into texts as well as into the ground.

A less fraught division of labor existed between mothers-in-law and daughters-in-law, based on twin houses excavated at Pingusugruk. The first house, built on a sand dune, had an elaborate kitchen with a so-far unique floor. The kitchen floor was leveled, apparently before structural elements were installed. After the leveling and still before any other construction, oil was poured on the floor and set on fire. The burnt sand provided an extremely hard work surface that did not shed sand.

Perhaps more interesting, after some years of occupation, the first house was joined by a mirror image house next to it, sharing the same tunnel entrance that then branched off to each katak. The kitchen for the new house was considerably larger. In terms of material culture, the older house's contents seemed likely to be that of a successful whaling family. What the archaeology shows is that the new house kitchen saw considerably more use than that of the first house. Whaling captains' wives are responsible for preparing food for the community on a regular basis, and an extremely large kitchen and a young and vigorous daughter-in-law to prepare most of the food seems like a nice benefit to a life well lived.

That the second house was inhabited by a younger, less-experienced family is suggested by the fact that it was accidentally set on fire by the men. This would have been a critical problem because living outside on an extended basis is not feasible in winter. Based on forensic fire analysis by a police officer who was a volunteer on this excavation,

the fire started in the sleeping platform area, where no evidence of lamps is normally found. This suggests that the men thought they could do as well with the lamps as the apparently absent women. Spilt burning oil scorched the interior from the floor to the top of the wall, spreading partway out toward the center of the house.

Rebuilding took place during winter, suggesting the residents doubled up next door for a while. The burnt wall planks were cut through above the frost line from inside the burnt house without removing the roof. They were then repositioned upside down (scorch marks now going from near the roof toward the floor) and jammed in place. The house was occupied for years afterwards.

These precontact Iñupiat twin houses, with their very different kitchens and their occupants' cooperation in cooking and in surviving a serious structural fire, illustrate a variety of themes that are documented in written records for the contact and historic periods. Division of labor by sex (e.g., lamp tending, cooking), division of labor by age (e.g., larger kitchen with evidence of assembly-line food production), community sharing (the large kitchen was too large for the needs of two households), aid in time of need, and a strong desire to keep family close by in the form of adjacent houses are some examples.

MORTUARY PATTERNS

At the beginning of the period, the Iñupiat followed traditional in-the-earth burial practices. During the course of the preceding Late Western Thule (LWT) period, burials became progressively simpler and shallower, culminating in the practice of surface and platform burials (Crass 1998, Jensen 2009). Once Christian missionaries arrived and were successful in converting people in an area, the practice of interment was readopted.

Wooden "boxes" of varying construction (arranged logs, hewn planks) were used from the Yukon to the North Slope. These usually were covered with piled logs or stones. Sometimes the remains were placed among rocks instead of in a box (Ray 1966). Platform or scaffold burials, with the remains wrapped in skins or cloth, or enclosed in a box (Brower 1942; Larsen and Rainey 1948, Murdoch 1892, Stefánsson 1919) also were used. They may have served to keep the deceased safe from dogs until sufficient logs could be gathered to construct a "box" burial. Elevated locations seem to have been chosen in many cases (Powell 1884; Stefánsson 1919).

Reports indicate that people would abandon a house if someone died within, leaving the deceased behind (Stefánsson 1919). The fear of dead bodies was widespread. These reports all postdate the introduction of Euroamerican contagious diseases to the region, raising the possibility that the very real likelihood of contracting illness from bodies had increased the fear of "corpse sickness" among the Iñupiat. Stefánsson's informants stated that contagious sicknesses were less common before contact (1919).

GRAVE GOODS

The provision of grave goods presumably varied through time, although comparisons with the preceding LWT period imply only a slight increase in grave goods, at least at Barrow. By A.D. 1750, grave goods were restricted to low-value items, although the majority of excavated precontact graves lack evidence for grave goods (Jensen 2009), as is also the case in postcontact situations (Stefánsson 1919). Stefánsson stated that if a person had multiple rifles, the worst one would be buried, but his informant believed that in the past, all would have been put on the grave. Often, larger items like sleds or kayaks were deliberately broken (Murdoch 1892; Ray 1883; Stefánsson 1919). At least one undated postcontact Barrow burial includes a kayak. How the deceased was dressed varied as well. Beechey (1831) describes eider skin under caribou clothing, and several sources (e.g., Gubser 1965; Rasmussen 1952) report that the deceased wore their “best,” while Spencer (1959:253) states that the deceased’s relatives kept any new clothing, leaving old clothes for the deceased.

AVENUES FOR ADDITIONAL RESEARCH

Practical Concerns

A still crucial part of archaeology for practitioners in the north is the remaining knowledge of historic and precontact technology among older folk. Some grew up using traditional technology and even more watched their parents or grandparents using its elements. Archaeologists can often identify tool function and use by asking an Elder. That does not relieve the archaeologist of all responsibility. If the question is not asked, the answer may be lost forever. Only because Elder Edna Leavitt mentioned it in passing do we know that women routinely resharpened stone tools—although whether such a practice was universal remains unsubstantiated. Logically, rather than waiting for someone to return from hunting to resharpen a dulled blade, a woman would sharpen it, but this documentation was nearly missed because no researcher had thought to ask.

Sites adjacent to the coast are often subject to erosion. The effects of anthropogenic climate change may include increased rates of erosion. In particular, less and thinner sea ice generally leads to longer periods of open water and increased wave action. Almost all Inupiat sites have excellent preservation, thanks to permafrost and generally cold conditions. Warming trends mean that the annual depth of thaw can increase, accelerating thaw and the deterioration of fragile organic objects and bone. Continued occupation of ancient sites means that near-surface cultural deposits are subject to the hazards presented by modern communities, from heavy equipment operations to attempts to tidy up the tundra, as well as the continuing reuse and digging into

abandoned houses as ice cellars, as at Tikigāq. Cultural Resource Managers have no triage plan to target the most endangered or most significant known sites. The intact and known archaeology is spectacular and is likely to be very informative if and when it is subject to investigation.

Culture, Social Structure

Thirty years ago, Burch optimistically presented a conference paper, later published (Burch 1988), titled “Towards a Sociology of the Prehistoric Iñupiat” suggesting that we can learn more about change and stability in social structure over time through further archaeological investigations. Sheehan (1997) posits that today’s Iñupiat culture is best understood as an extension of precontact society and, as a corollary, that precontact social relations can be better interpreted in light of what the historic record and today’s culture can teach us.

What is being discussed here is not crude ethnographic analogy. It is the direct historical approach (Steward 1942), something which the specific historical conditions of the Iñupiat case make eminently reasonable (see Burch 2010 and Jensen 2012 for an extended discussion). While this must be done thoughtfully and can be debated in specific instances, it is unreasonable to abandon any attempts due to imperfect ethnographic or historic data, especially given that all archaeological data, even in the Arctic, suffer from the same issues.

Sheehan (1997:174–175) argued that cross-regional trade was necessary to support any sustained inland occupation, due to the notorious susceptibility of caribou populations to periodic crashes. Such inland occupation, in turn, was extremely beneficial in procuring the quantities of interior products needed to provision major whaling settlements, products of the hunt such as caribou hides harvested at the appropriate season. These arguments about the interdependence of coastal and interior populations and the oil trade are essentially untested (Sheehan 1997). Archaeological testing could be effective through fieldwork at the sites of satellite residences and at terminal interior campsites. A decline in the availability of sea-mammal oil at inland sites might be an indicator.

Maguire recorded the political and communal hierarchy at Nuvuk, so we know that even in the 1850s, some whaling captains were politically more important than others, and these whaling captains led the communities. Decades after Native warfare had ceased, Captain Maguire’s (1988) crew and vessel were approached by a group of warriors from Nuvuk, organized by one of the two leading umialiit. The Iñupiat eventually backed off without incident. Maguire also recorded that disputes were brought for settlement to these two whaling captains. Today on the North Slope the majority of the business, government, and cultural leaders are whaling captains and their wives. Research on residential proximity of umialiit and crew members and how it changed through time would be very interesting, since the time depth may be considerable (Darwent et al. 2013).

Non-Native Sites

A final important issue in the archaeology of northern Alaska relates to the many non-Native sites in this region. Although they currently represent 56 percent of the National Register of Historic Places sites in the region, with the exception of the Seward Peninsula Gold Rush sites they are much neglected in terms of research. Most notable may be the old Naval Arctic Research Laboratory and its over 180 structures plus auxiliary research sites scattered across the North Slope. As John Cotter, father of American historic archaeology, observed about older standing structures, "This is archaeology all around you." With buried structural remains, even in permafrost, archaeologists can be hard put to identify the alterations undertaken during their use. With standing structures, the evidence is often clearer. These sites also have tremendous research potential, which can easily be lost if they are bulldozed unstudied in an effort to clean up the tundra.

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PART III

.....
EASTERN ARCTIC
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CHAPTER 27

RECONSTRUCTING MIDDLE AND LATE HOLOCENE PALEOCLIMATES OF THE EASTERN ARCTIC AND GREENLAND

SARAH A. FINKELSTEIN

INTRODUCTION

THE role of climate change has long been debated in the interpretation of the archaeological record. While it is now widely acknowledged that social and cultural factors need to be considered to explain fully the data gathered from archaeological sites, there has been renewed interest in exploring the role of paleoclimate and other environmental changes in cultural change. This interest has been driven in part by the availability of more robust paleoenvironmental records from more locations at higher temporal resolution, providing the opportunity to more carefully assess the environmental context associated with particular archaeological sites.

Because of the extreme nature of the climate in the Arctic, the role of paleoclimatic change in cultural shifts has been of particular interest (Barry et al. 1977; Mudie et al. 2005). Despite this interest, there have been relatively few paleoclimatic records produced for a region of this size and physiographic diversity. This low density of sites for paleoclimatic reconstruction is due to the vastness and the remoteness of regions occupied by prehistoric Arctic peoples. In the past decade, many more records have been produced, and an important legacy of the 2007–2009 International Polar Year is the production of many new datasets and new syntheses of paleoclimatic history across the Arctic. The purpose of this chapter is thus to summarize available records, building

upon previous reviews of Holocene paleoclimates of the Arctic (Gajewski and Atkinson 2003; Kaufman et al. 2004; Kaufman et al. 2009; Miller et al. 2010).

Humans have occupied the eastern Arctic and Greenland since at least as early as 4800 cal B.P. (Maxwell 1985). Since that time, significant changes in climate, sea-ice conditions and ecosystems have taken place. Thus, this chapter provides an overview of Arctic paleoenvironmental changes with an emphasis on the latter portion of the Holocene, coinciding with the period of human occupation. The geographic region of focus includes the Canadian Arctic Islands, the eastern Canadian Arctic mainland in the northern parts of continental Nunavut and Nunavik (north of the tree line), and Greenland. This study region corresponds to the eastern part of the geographic “western Arctic” (0–180° W) in a circum-Arctic context, but for clarity, it is referred to here as the “eastern Arctic,” recognizing a North American bias to this terminology.

Although there is a tendency to think of Arctic climates as uniformly cold and dry, meteorological studies confirm that modern climates are heterogeneous in the Arctic (Maxwell 1980). The region of study spans more than 15 degrees of latitude and more than 90 degrees of longitude. Thus, the basic heat and energy exchanges, including surface radiative balance, insolation, seasonality and day length, are highly variable across this large geographic area. In addition, there are major physiographic differences across the study area, with mountains and glaciers in the eastern portion of the Canadian Arctic Archipelago, and low relief in the west. Open-water polynyas in the vicinity of Baffin Island bring more maritime-influenced climates and more precipitation, whereas more perennial ice and added continentality bring drier climates in the western Arctic islands. For example, mean annual precipitation recorded at Resolute in the Central Canadian Arctic is 150 mm, compared to 412 mm at Iqaluit on Baffin Island (Environment and Climate Change Canada 2003). These fundamental differences in modern climate and physiography preclude the application of one paleoclimatic history onto this region.

SOURCES OF PALEOENVIRONMENTAL RECORDS

A variety of archives are used to reconstruct past climates and environmental changes in the Arctic, frequently in combination to obtain the most robust reconstructions. Some of these archives yield “proxies,” such as pollen grains, which are indicators for past environmental conditions during time periods predating the instrumental record (Figure 27.1). These proxies can sometimes be used to produce quantitative measures of past climate change at the study location through multivariate statistics and transfer function development for key variables such as temperature, precipitation, or ice cover. Site-specific paleoenvironmental reconstructions for particular locations can be integrated into regional (Finkelstein and Gajewski 2008) or continental (Kaufman et al. 2004, 2009) networks to produce paleoclimate reconstructions, and to isolate local

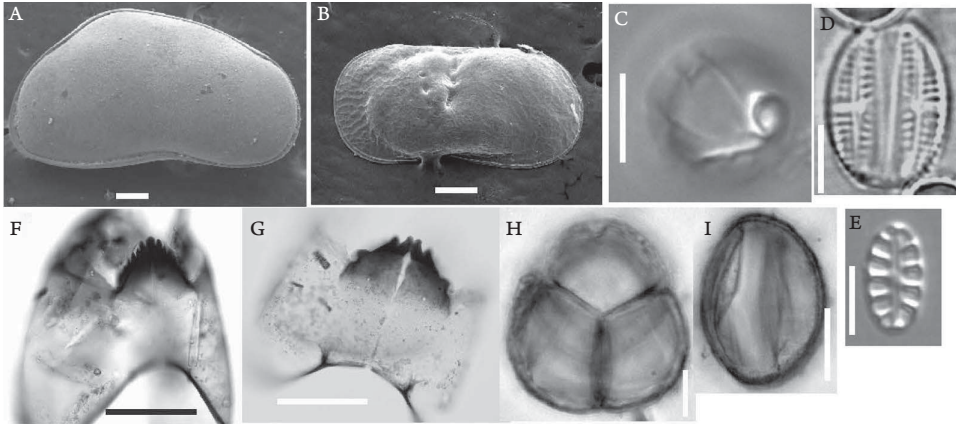


FIGURE 27.1 Biological indicator organisms used to infer paleoclimatic changes in the Arctic. (a, b) SEM images of ostracode taxa *Candona rectangulata* and *Limnocythere liporeticulata*; scale bar = 100 µm (photograph, Joan Bunbury); (c) light micrograph of chrysophyte cyst; scale bar = 5 µm (photograph, Sarah Finkelstein); (d, e) light micrographs of diatom taxa *Amphora pediculus* and *Staurosirella pinnata*; scale bar = 5 µm (photographs, Sarah Finkelstein); (f, g) light micrographs of chironomid taxa *Orthocladius* type 1 and *Heterotrissocladius maeaeeri* type 2; scale bar = 100 µm (photograph, Andrew Medeiros); (h, i) light micrographs of pollen grains of *Cassiope tetragona* and *Saxifraga oppositifolia*; scale bars = 10 µm (photographs, Matthew Peros).

physiographic factors from larger-scale controls on environmental change. Ice cores, marine and lacustrine sediment cores, and land-based records are the major sources of paleoclimate archives for the Arctic.

ICE CORES

The Greenland ice sheet and the ice caps of Baffin, Ellesmere, and Devon Islands provide records of paleoenvironmental change that span the Holocene, and in some cases, extend into the late or middle Pleistocene. These ice cores are repositories for a variety of proxies and have been critical to paleoclimatic reconstructions owing to the high resolution available (often annual) and the long length of the records. Time scales for ice-core records are developed using annual layer counts, volcanic ash (tephra) horizons of known age and comparisons with other ice cores (Fisher et al. 1995). Stable oxygen or hydrogen isotope ratios ($\delta^{18}\text{O}$; $\delta^2\text{H}$) in the water molecules making up the ice are used to reconstruct atmospheric conditions and paleo-temperatures, averaged over a large region (Groottes and Stuiver 1997), and greenhouse gas concentrations measured in trapped air bubbles of known age allow analysis of past global CO_2 and CH_4 concentrations and biogeochemical cycling (Stauffer et al. 2002). The concentrations of pollen grains and their taxonomic assemblages in Arctic ice cores have been used to infer past changes in atmospheric circulation and air temperature (Bourgeois et al. 2000).

While the above ice-core proxies are generally used to produce large-scale (hemispheric or global) paleoclimatic or biogeochemical reconstructions, other proxies derived from polar ice cores relate to more local conditions. For example, in the Arctic, the amount of summer melt can be determined from ice layering patterns and this measurement is correlated to local summer air temperatures (Fisher et al. 1995). Also, the concentrations of aerosols derived from salt spray have been used to reconstruct local sea-ice extent (Grumet et al. 2001); reconstructions of sea-ice extent have particular value in archaeological contexts due to the importance of sea ice as a hunting platform (Mudie et al. 2005). The location of the ice core determines the applicability of its record to a particular site or spatial scale. For example, the Renland record from coastal east Greenland reflects more closely processes in the Norwegian Sea and thus has a more local signal than the interior Greenland Ice Core Project (GRIP) and Greenland Ice Sheet Project (GISP) records from the summit of the ice cap; the GRIP and GISP records capture a more homogenized paleoclimatic signal applicable to an area more continental in spatial scale (Larsen et al. 1995).

MARINE SEDIMENTS

Marine sediments provide the longest records of paleoenvironmental change available. They also provide continuous archives and have been fundamental to the discovery and explanation of major phases in Earth's paleoclimate history, including the onset of the Quaternary ice ages (e.g., Hays et al. 1976). Marine sediments contain biogenic records in the form of fossilized remains of benthic and planktonic aquatic microorganisms including foraminiferae, diatoms, coccolithophores, dinoflagellate cysts and other palynomorphs, yielding information on past climates, surface ocean conditions and circulation. Organic molecules indicative of particular conditions (biomarkers) are increasingly used as well for paleoceanographic reconstructions. The IP25 marker, for example, is an organic macromolecule derived from diatoms and has been used to reconstruct sea-ice extent in the Arctic (Vare et al. 2009).

Ratios of stable oxygen isotopes ($\delta^{18}\text{O}$) in calcareous shells of fossilized marine organisms are frequently used in sediment records to reconstruct paleo-temperatures. The $\delta^{18}\text{O}$ signature reflects the fact that under lower temperatures, water molecules containing the lighter isotopes evaporate increasingly readily, enriching the seawater in heavier isotopes (reviewed in Bradley 1999). Material of terrestrial origin in marine sediment cores can also be used to reconstruct dust sources, aridity, run-off from the continents, and the frequency of ice-rafting events.

On time scales of $>10^4$ years, the chronology for ocean sediment cores can be established by "tuning" to the frequencies of orbitally induced changes in insolation, but for Holocene time scales, the cores must be dated using radioisotopes, although material for dating may be in very low abundance (Bradley 1999). Paleomagnetic secular variation is another approach to dating ocean sediments (Ledu et al. 2010), but it is applicable

only in particular cases. One additional drawback of marine sediment records for questions of archaeological interest is the low temporal resolution. The average accumulation rate for sediments of the central Arctic Ocean for example is .5–1 cm per thousand years (kyr) (Stein 2008), making it difficult to have more than one data point per millennium, fewer if bioturbation is an issue. Cores from nearer shore or continental shelf environments accumulate sediments more quickly and can provide higher-resolution records of Holocene environmental changes (Mudie et al. 2005).

The collection and analysis of ocean sediments from the Arctic Ocean has lagged behind other regions owing to major logistical and technological challenges. Over the past decade however, major international ocean-drilling programs have taken place, providing many new deep-sea records (Levac et al. 2001). The heavily ice-covered continental shelf region of the Canadian Arctic islands remains poorly sampled but several oceanographic cruises through the Northwest Passage aboard CCGS *Amundsen* since 2004 have resulted in the publication of critical records for Holocene Arctic paleoceanography and paleoclimatology (Ledu et al. 2010; Vare et al. 2009). These records provide quantitative estimates of sea-surface temperature from assemblages of dinoflagellate cysts and the IP25 biomarker. Large datasets are available linking modern dinoflagellate cyst assemblages to sea-surface temperature and salinity (de Vernal et al. 2001), permitting these quantitative reconstructions based on fossil assemblages. Sediment cores taken from the relatively shallow interisland channels can provide a sediment accumulation rate of up to $141 \text{ cm} \cdot \text{kyr}^{-1}$ (Ledu et al. 2010), permitting analyses of proxy indicators at century or even decadal scales, and consequently, more direct comparisons with archaeological records are possible (Mudie et al. 2005).

LAKE AND WETLAND SEDIMENTS

Lake sediment records generally provide an opportunity to develop reconstructions at higher temporal resolution than ocean sediments because of more rapid rates of sediment accumulation. As in the case of marine sediments, analyses of lake sediment records in the Arctic make use of both biological and physical proxies for paleoenvironmental reconstructions. While pollen grains are found at low concentration in the sediments of most Arctic lakes, pollen records have been among the most successful at developing quantitative temperature reconstructions (Peros and Gajewski 2008; Zabenskie and Gajewski 2007). The success of palynological records at reconstructing past temperature is due to the tightly coupled relationship between vegetation and climate, and due to the availability of large databases of modern pollen assemblages that have been related statistically to climate parameters (Whitmore et al. 2005). These databases permit the application of modern analog statistical approaches and the production of quantitative temperature reconstructions.

In addition to assemblage changes and quantitative inferences of past climates, pollen concentrations can be measured in sediment and ice records, and used as a proxy

for biological production (Gajewski et al. 1995), although this application depends on a robust age-depth model. One analysis of a large database of modern pollen assemblages and climate variables suggested a relationship between pollen assemblages and sunshine; this relationship was used to reconstruct sunshine over past centuries from fossil pollen lake sediment records, and to infer past changes in the synoptic circulation patterns controlling cloud cover (Fréchette et al. 2008). Reconstructions of sunshine or cloud cover may be of more relevance to understanding the archaeological record than more generalized paleoclimate reconstructions.

In Arctic lake sediments, diatoms (single-celled algae in the division *Bacillariophyta*) have been widely applied for reconstructing paleolimnological conditions owing to the abundance of these organisms in Arctic lakes, the generally good preservation of their siliceous frustules, and the availability of autecological data linking particular diatom taxa to particular limnological conditions such as pH, nutrient status, or salinity (Wolfe 2003). Diatom records have also been used for paleoclimate inference, mainly through the assemblage changes associated with changes in the duration of ice cover (Smol 1988). Some records include enumerations and analyses of other siliceous microfossils, including resting cysts and plates of Chrysophycean algae, supplying additional information on nutrient status and limnological conditions (Wolfe and Perren 2001). Biogenic silica (BSi) concentrations can also be measured in sediment cores and are a proxy for overall abundance of organisms producing siliceous body parts, mainly diatoms, in most systems. Relative to detailed taxonomic analyses on the microscope, BSi measurements provide a more rapid assessment of total algal production. Since total algal production is often limited by temperature or ice cover in the Arctic, these measurements can be used to complement other paleoclimatic indicators in a lake sediment record (McKay et al. 2008). Because freshwater fish may be present in zooarchaeological assemblages of some Arctic archaeological sites, even paleolimnological inferences not directly related to climate are relevant to interpreting the archaeological record and better understanding the use of freshwater resources.

Most biostratigraphic studies on cores from Arctic lakes are based on pollen or diatom records, but the integration of additional biological proxies provides more complete reconstructions of ecosystem changes during the Holocene. Chironomids are a class of Dipteran insects with an aquatic larval stage; the head capsules of these larvae are well preserved in sediment records, are present in reasonable abundance in Arctic lakes, and have been used to reconstruct temperature at several Arctic sites (Rolland et al. 2008). Ostracodes are small bivalved crustaceans; a study of their modern biogeography in Arctic lakes suggests potential for application to paleoenvironmental reconstruction (Bunbury and Gajewski 2009). Ostracodes in marine sediment records have also been used to reconstruct sea-ice extent (Cronin et al. 2010).

Lake sediments also offer physical proxies of past environments. Annually deposited laminations (varves) are found in a small number of lakes, providing robust records of past environmental changes. Once laminations are proven to be annual through corroboration with a radioisotope dating technique, varves enable the development of very high-resolution paleoenvironmental records with highly accurate and precise

chronologies. The thickness of the individual varve layers has been positively correlated to glacial melt and summer temperatures in periglacial systems (Moore et al. 2001), and to precipitation and run-off in ice-free catchments (Hardy 1996). Individual varves can also be analyzed for particle size, geochemical properties, and microfossils, producing highly resolved records of past environmental changes (Besonen et al. 2008). Peat deposits are rare in the High Arctic but when they do occur, they provide valuable paleoenvironmental information as they are readily datable by radiocarbon, tend to contain abundant biological remains, and the presence of peat implies adequate moisture, warm enough temperatures, and a surface moisture balance positive enough for its development (Ovenden 1988).

As is the case for marine sediments, biomarkers are also applicable in lake sediments. For example, deuterium ratios in organic molecules derived from leaf waxes have been used for paleohydrological reconstructions (Thomas et al. 2012), and alkenones (long-chain organic molecules produced by aquatic microorganisms) and GDGTs (lipids found in cell membranes) have also been recovered in sufficient quantity from lake sediments for paleo-temperature reconstructions (Pearson et al. 2011).

The application of proxies derived from wetland and lake sediments to paleoclimatic reconstructions depends on the development of a credible chronology for their deposition. Dating sediment records in the Arctic remains problematic due to low abundance of datable materials and abundance of ancient carbon derived from carbonate bedrock, and pre-Quaternary coal seams (Wolfe et al. 2004). Progress has been made thanks to the wider use of accelerator mass spectrometry (AMS) radiocarbon dating, and the isolation of small organic fractions from the sedimentary matrix using chemical means or stereo-microscopy.

EVIDENCE FROM THE LAND SURFACE

There are various types of land surface features used in paleoclimatic reconstructions in the Arctic. Glaciological and geomorphic studies of past ice extent using surface features and lichen-free zones have been used to infer past periods of glacial expansion and retreat (Bradley 1990; Miller et al. 2005). Cosmogenic radionuclide inventories (e.g., ^{14}C) in exposed rock surfaces have also been used to complement these geomorphic approaches to reconstructing past changes in ice cover (Anderson et al. 2008). Coastal landforms such as beach ridges are indicative of sea-level changes, sea-ice cover, and associated wave energy, sediment sources, and climate, while also yielding shell, driftwood, and other remains for radiocarbon dating (Mason 2010). Bowhead remains in coastal areas provide a critical proxy for reconstructing both whale migration routes and sea-ice extent (Bradley 1990).

Borehole studies involve measurements of temperatures at depth, which are a direct legacy of past surface air temperatures (Beltrami and Nitoiu 2009). The maximum temporal resolution of temperature measurements derived from borehole datasets

decreases with time due to the diffusion of heat through conduction, and may only be at most at the resolution of centuries. Borehole records, however, are important for confirming trends derived from proxy records as they represent an actual measurement of past temperature. There are few borehole records from the Arctic, although Beltrami and Taylor (1995) provide a record to a depth of 600 m from Neil Well on Ellesmere Island, spanning the past 2,000 years.

The previous sections summarize the major proxies available for reconstructing Holocene climate changes in the Arctic. For shorter-term climate changes taking place over the most recent one or two centuries, it is possible to make use of historical datasets (e.g., Catchpole 1995), although continuous instrumental records of temperature and precipitation for the eastern Arctic only exist since A.D. 1950, and only for a small number of weather stations (Gajewski and Atkinson 2003). Analyses of historical air photos and satellite imagery (Sturm et al. 2001), and even tree-ring analysis on Arctic shrubs show some promise for tracking recent climate changes (Zalatan and Gajewski 2006) but cannot be easily applied to climate reconstructions extending earlier into the Holocene because of the scarcity of fossil wood for cross-dating.

RECONSTRUCTIONS OF HOLOCENE PALEOCLIMATES FOR THE EASTERN ARCTIC AND GREENLAND

The above suite of proxy indicators has been used to produce reconstructions of Holocene paleoclimates for individual sites, and in some cases multiple records have been synthesized to produce regional-scale reconstructions. As more site-specific reconstructions have become available, the synthesis studies are even more relevant for archaeological applications, as they serve to highlight regional differences and the role of local physiographic factors such as bedrock type, relief, or proximity to the coast, in constraining the response of local climates and landscapes to regional or global-scale processes that influence the climate (forcings). Unless explicitly indicated as ^{14}C years, all ages are reported here as calibrated calendar years before present and noted as “cal B.P.” Dates for the past millennium are given as the calendar year A.D.

The Holocene Thermal Maximum

The major drivers for glacial-interglacial cycling during the Quaternary (late Neogene) period are the changes in Earth-Sun geometry, known as Milankovitch cycles, which affect the amount, the timing, and the spatial distribution of incoming solar radiation (Hays et al. 1976). Milankovitch cycling also affects the climate system on shorter time

scales, including within the Holocene. The calculations of Berger and Loutre (1991) indicate that the maximum receipt of summer solar radiation in the Northern Hemisphere took place in the early Holocene, around 10,000 cal B.P. (Figure 27.2a). It has long been recognized that this insolation maximum resulted in highest postglacial summer temperatures for the Arctic in the early Holocene, during a period known as the Hypsithermal or the Holocene Thermal Maximum (HTM) (Fairbridge 2009).

Kaufman et al. (2004) synthesized available continuous records ($n = 140$) of the HTM for the western circum-Arctic (0 – 180° W). Sites in the western Canadian Arctic show thermal maxima more coincident with the insolation maximum ($\sim 10,000$ cal B.P.), whereas sites in the eastern Canadian Arctic show highest temperatures later in the Holocene. The lag in the warming in the eastern Arctic has been linked to the persistence of the Laurentide Ice Sheet until at least 6500 cal B.P. (Dyke and Prest 1987), lowering local temperatures.

Despite the publication of new whole-Holocene paleoclimate records since the synthesis of Kaufman et al. (2004), quantitative estimates of HTM summer temperatures remain available only for fewer than 20 sites across the entire western circum-Arctic, and range from 0° to 6° C warmer than twentieth-century averages (Larsen et al. 1995; Peros and Gajewski 2008; Rolland et al. 2008). The large range in estimated paleotemperatures during the HTM is likely a combination of the effect of errors in the transfer functions derived from microfossils used to produce the numerical estimates, and regional climate variability, but more records are required to better constrain the estimates and to understand their ranges.

Evidence for human occupation in the eastern Arctic and the Canadian Arctic Islands begins to appear by around 4800 cal B.P. (Maxwell 1985). In some Arctic regions, the appearance of the first humans took place long after thermal maxima, whereas in the eastern Arctic, it may have coincided with warmer temperatures. Thus the prehistory of the Arctic as a whole needs to be interpreted in the contexts of both the large variability in paleoclimates, caused by local factors such as the persistence of glacial ice, multiyear sea ice and topography, and the general long-term post-HTM cooling trend of the late Holocene.

Neoglacial Cooling

Soon after human arrival in the eastern Arctic mainland, the Canadian Arctic Islands and Greenland, regional temperatures began to decline as Milankovitch cycling led to continued insolation deficits (Figure 27.2a), and changes in ocean circulation affected heat and moisture transport in the polar regions (Koç et al. 1993). These temperature declines led to readvances of mountain glaciers on Baffin Island and ice caps around the Arctic (Miller et al. 2005). Declining temperatures appear to have become important in terms of ice-mass balance and ecosystem dynamics across the Arctic after 3500 ± 500 cal B.P. (Bradley 1990; Miller et al. 2010). As is the case for the onset of the HTM, regional

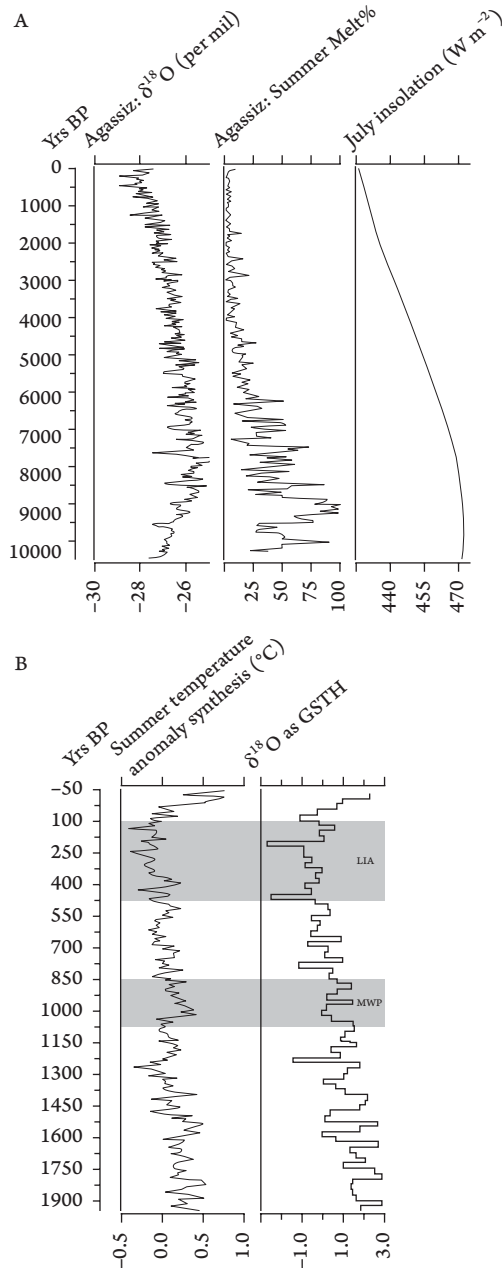


FIGURE 27.2 Synthesis paleoclimate data. (a) Holocene, including composite $\delta^{18}\text{O}$ and summer melt percentages for Agassiz ice cores 1984 and 1987 (Fisher et al. 1995), and July insolation at 70° N calculated by Berger and Loutre (1991); (b) past 2,000 years, including mean summer temperature anomalies relative to the 155–965 yrs B.P. (A.D. 985–1795) reference range derived from a synthesis of 23 high-resolution records (Kaufman et al. 2009), and composite $\delta^{18}\text{O}$ (Agassiz ice core) and ground-surface temperature history (GSTH) measured from the Neil Well Borehole (Beltrami and Taylor 1995). Gray bars indicate the timing of the Medieval Warm Period and the Little Ice Age in the Northern Hemisphere synthesis of Mann et al. (2008).

Illustration by Sarah Finkelstein

variability in the onset of Neoglacial cooling is significant (Kaufman et al. 2004) because of variability in physiography, proximity to the coast, and other local factors.

There is considerable evidence for post-HTM cooling from numerous proxies, including declines in $\delta^{18}\text{O}$ values and in summer melt percentages in the Agassiz and Greenland ice cores (Figure 27.2; Fisher et al. 1995; Larsen et al. 1995). Driftwood occurrences in the Canadian Arctic Islands decline following 3000 cal BP, indicating greater extent of multiyear sea ice (Bradley 1990). Levac et al. (2001) show a decrease in sea surface temperature after 3600 ^{14}C yr B.P. in Baffin Bay based on dinocyst assemblages and a pollen record from the Boothia Peninsula indicates a summer temperature decrease of $\sim 1^\circ\text{C}$ after 3000 yrs B.P. (Zabenskie and Gajewski 2007).

In the multiproxy records available from Geographical Society Island in coastal east Greenland (Cremer et al. 2001), decreases in diatom concentration beginning around 6500 cal B.P. and intensifying around 4500 cal B.P., followed by the replacement of the pollen of shrub *Betula* with pollen indicative of poorer dwarf heaths dominated by *Cassiope* and *Salix*, are interpreted as the onset of Neoglacial cooling. Grain size analysis in those records is used to infer an increase in precipitation at the onset of Neoglacial cooling, followed by a decrease in temperature (Cremer et al. 2001). For Disko Bugt in west-central Greenland, physical properties and biological indicators in fjord sediments are used to infer colder atmospheric conditions, less glacial melt, and more sea-ice cover after 3500 cal B.P.; this cooling may be linked to changes in settlement patterns and resource-procurement strategies of Saqqaq and Dorset peoples (Moros et al. 2006).

The Medieval Warm Period and the Little Ice Age

The Medieval Warm Period (MWP) and Little Ice Age (LIA) have been of particular interest to Arctic archaeology due to early hypotheses linking the MWP to the initial eastward migration of the Thule in response to more open water under less severe sea-ice regimes, and the LIA to abandonment of sites and a change in hunting practices due to increased sea ice extent and duration, and associated decline in availability of whales (Maxwell 1985). Improved reconstructions of MWP and LIA paleoclimates in the Arctic are particularly relevant given the recent reporting of radiocarbon dates of ~ 1200 A.D. for the Thule migration, about two centuries later than previous estimates (Friesen and Arnold 2008).

While the MWP and LIA were first described for Europe, it is now evident that climate changes during these time periods can be detected globally. The dates given for the MWP and LIA in the Northern Hemisphere temperature synthesis of Mann et al. (2008) are A.D. 950–1100 and A.D. 1450–1850; the timing and the magnitudes of temperature changes at any particular location, however, vary with local physiographic and meteorological factors. Modelling studies have been used to explain these submillennial climate fluctuations as interactions between a variety of forcings, mainly volcanic and solar activity, with possible influences of ocean-atmosphere dynamics and greenhouse gas fluctuations (Wanner et al. 2008).

In the context of the Arctic, there is evidence for climatic oscillations that affected ecosystems at the time of the MWP and LIA. Kaufman et al. (2009) provide a synthesis of available paleo-temperature records with decadal or annual resolution spanning the past two millennia for the Arctic (Figure 27.2b). The 23 Arctic records used in that synthesis are limited to varved lake sediments, ice cores, and tree-ring series. The compilation of these temperature records indicates somewhat warmer temperatures relative to the A.D. 985–1795 reference time period between A.D. 950 and 1150 (800–1000 yrs B.P. in Figure 27.2b) and cooler than average temperatures between A.D. 1600 and 1850. The magnitudes of these century-scale variations at the time of the MWP and the LIA in this synthesis dataset are small relative to the long-term trend, with maximum warming about .4° C above the average for the reference time period for the MWP and also about .4° C below average for the LIA. Superimposed on these small century-scale fluctuations, the synthesis curve of Kaufman et al. (2009) indicates a gradual long-term cooling, consistent with post-HTM Neoglacial cooling.

While the advantage of the datasets used in the synthesis of Kaufman et al. (2009) is the very high temporal resolution (decadal or annual), the limitation is that many Arctic proxy records of lower resolution but high value for paleoclimate reconstruction were not included. Other proxy records available from the Arctic provide opportunity for site-specific quantitative reconstructions of temperature fluctuations over the MWP and the LIA. Many of the reconstructions not included in the synthesis of Kaufman et al. (2009) similarly show that the temperature increases at the time of the MWP were small to negligible relative to those recorded during the HTM, and relative to the warming that has taken place since the twentieth century.

Examples of evidence for limited Arctic warming at the time of the MWP derived from lower-resolution records include a small increase in the pollen of Low Arctic taxa such as *Betula* from A.D. 1050 to 1550 in the Geographical Society Island records of east Greenland (Cremer et al. 2001), suggesting longer and warmer growing seasons at this time. In a diatom record from Lake TK-2 in central mainland Nunavut, increases in small benthic taxa coincident with decreases in larger, heavier planktonic algae typical of more turbulent and more weakly stratified lakes were interpreted as possibly indicative of warming during the time period spanning A.D. 820–1390 (Paul et al. 2010); these taxonomic changes are small, however, compared to changes that took place in other sections of the Holocene record from that site. Summer air temperatures ~1° C warmer than the long-term average were reconstructed using a numerical transfer function and fossil chironomid assemblages in a core from Lake 4 on Southampton Island between A.D. 1160 and 1360 (Rolland et al. 2009). Land-based evidence has also been used to track warming at this time period. For example, a lack of radiocarbon dates on vegetation incorporated within glacial ice on Baffin Island between A.D. 1000 and 1250 suggests ice retreat at that time period (Anderson et al. 2008).

On the other hand, the MWP is not clearly indicated in analyses of the Renland Ice Core (Larsen et al. 1995), while the composite $\delta^{18}\text{O}$ -borehole record from Ellesmere Island indicates long-term cooling through the MWP time period (Figure 27.2b;

Beltrami and Taylor 1995). Other microfossil-based paleoecological records from the eastern and central Canadian Arctic similarly show no changes at this time period (Briner et al. 2006; Rolland et al. 2008; Wolfe 2003). The lack of evidence for MWP warming at selected sites may be related to regional variability in sensitivity to climate change, or it may be related to inadequate temporal resolution in the records to detect fine-scale climate changes taking place during the MWP.

Following the MWP, long-term Neoglacial cooling culminated in significant glacier advances in the Arctic during the LIA, and expansion of sea-ice cover after A.D. 1400 in the Baffin region, as reconstructed using sea-salt aerosols in the Penny Ice Cap (Grumet et al. 2001). It has long been suggested this LIA was the coldest period of the whole Holocene (Bradley 1990). The minima in $\delta^{18}\text{O}$ values in the Renland Ice Core (Larsen et al. 1995) and low values in various geochemical proxies from the Geographical Society Island sites (Cremer et al. 2001) between A.D. 1450 and 1950, for example, support this hypothesis. Several paleo-temperature records for Baffin Island derived from diatom analyses indicate long-term cooling since at least 2000 yrs B.P., with temperatures possibly $\sim 2^\circ\text{C}$ cooler between A.D. 500 and 1800 than earlier in the Holocene (Joynt and Wolfe 2001). Minimum diatom valve concentrations between A.D. 1650 and 1750 were interpreted as indicative of minimum temperatures for the whole Neoglacial time period (Wolfe 2003) and minimum diatom-reconstructed pH values between A.D. 1500 and 1850 at Lake CF3 were interpreted as indicating maximum ice cover and cooler temperatures (Briner et al. 2006). Thin varves and fine particle sizes in lake sediment records from Ellesmere Island also suggest that the maximum extent of the LIA took place around A.D. 1730–1890 (Besonen et al. 2008). Those dates are consistent with minimum temperatures recorded in the composite $\delta^{18}\text{O}$ -borehole record from Neil Well (Figure 27.2b; Beltrami and Taylor 1995).

The most recent millennium is of great interest to Arctic archaeologists because of the Thule migration and associated cultural changes. While there have been longstanding hypotheses linking the changing climates of this time period, including the MWP and the LIA, to these cultural changes, it has been difficult to prove these connections. Now that more paleoclimate datasets at higher resolution are available for this time period, it is clear that long-term Neoglacial cooling was taking place through the entire past millennium. Available temperature reconstructions indicate that the whole of this time period was cooler than earlier time periods of the Holocene. While some records indicate somewhat warmer temperatures during the MWP, others indicate little or no change, suggesting that these subtle changes in climate may not have been significant enough to affect resource availability. While there is little indication for an intense MWP in the Arctic, the reconstructions for the LIA do show significant cooling and provide evidence for ecological changes. Several reconstructions indicate that the LIA was the coolest time period of the whole Holocene. Thus, these climate changes at the time of the LIA were likely large enough to affect Arctic ecosystems and landscapes, possibly driving some cultural changes. The cooling at the time of the LIA was time transgressive, however, and not uniform in magnitude, therefore regional responses would have varied considerably.

CONCLUSIONS

This overview of paleoclimate records from the eastern Arctic indicates spatial heterogeneity in the timing and the magnitude of paleoclimatic changes across this large and diverse region. Latitudinal and longitudinal differences in climate history may be related to ocean and atmospheric circulation and the relative position of important synoptic boundaries such as the polar front. Paleoclimatic reconstructions derived from certain sources (e.g., ice cores) are appropriate for large regions and it is difficult to extrapolate from those to smaller spatial scales or particular sites that might be relevant to archaeological studies. Thus, paleoclimate data for archaeological applications need to be integrated across multiple scales and ideally would include general syntheses as well as highly local reconstructions.

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CHAPTER 28

PAN-ARCTIC POPULATION MOVEMENTS

The Early Paleo-Inuit and Thule Inuit Migrations

T. MAX FRIESEN

INTRODUCTION

POPULATION movements of various types and scales were common in the Arctic past. In the Inuit ethnographic record, migrations were so frequent that they can be seen as a “normal” part of life, and a common strategy to deal with social, economic, and environmental challenges and opportunities (e.g., Aporta 2009; Gulløv 1997; Mary-Rousselière 1991; Rowley 1985). In the more ancient archaeological past, population movements are seen clearly in periodic abandonment and repopulation of many eastern Arctic regions, presumably through migration from adjacent areas. At the greatest scale, however, are two migration episodes that spanned the entire breadth of the continent from Alaska to Greenland. These are the early Paleo-Inuit migration, which led to the first occupation of most of the eastern Arctic, and the much later Thule migration, which brought the direct ancestors of modern Inuit to Canada and Greenland. For both of these “events,” recently published information allows more detailed reconstruction of their timing, speed, and nature. In both cases, chronology is a critical factor; by furthering our understanding of the timing of the migrations, we can understand more about how and why they occurred.

THE EARLY PALEO-INUIT MIGRATION

For several millennia following early Holocene deglaciation, only the southern margins of the North American Arctic were settled by Paleoindian, Archaic, and related peoples.

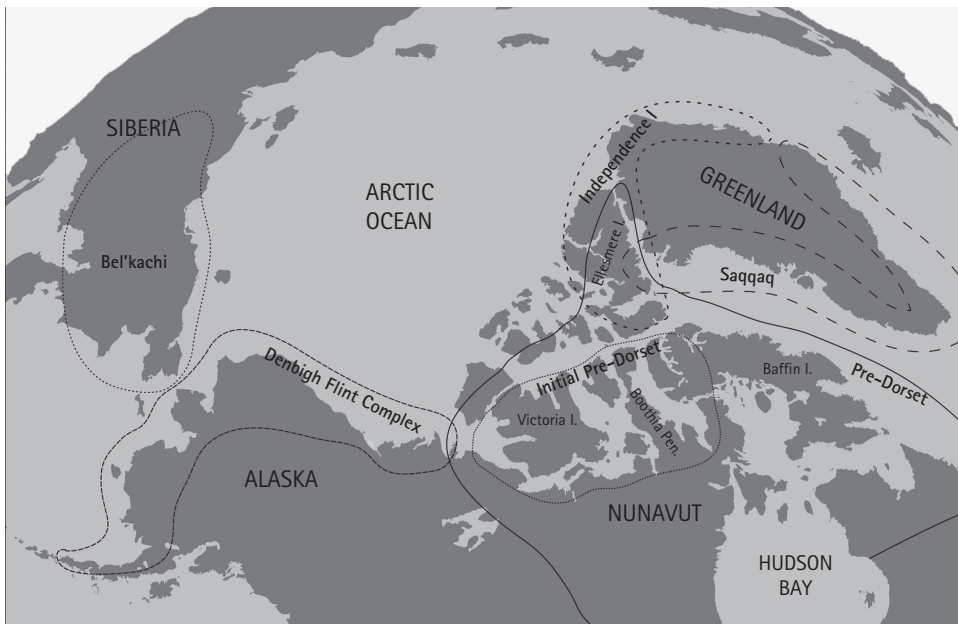


FIGURE 28.1 Approximate maximum extent of the Bel'kachi and Early Paleo-Inuit cultures. "Initial Pre-Dorset" refers to areas in the eastern Arctic occupied before 2500 cal B.C.

Map drafted by Matthew Walls

By around 3200 cal B.C., or perhaps earlier, descendants of the Siberian Neolithic Bel'kachi tradition crossed Bering Strait and occupied portions of northwest Alaska (Mochanov 2009 [1977]; Powers and Jordan 1990) (Figure 28.1). In the North American Arctic, this new cultural entity is often known as the Palaeoeskimo tradition or Arctic Small Tool tradition (ASTt), however it will be referred to here as the Paleo-Inuit tradition (see Friesen 2015, for discussion). The earliest part of the Paleo-Inuit tradition in Alaska is known as the Denbigh Flint complex (Giddings 1964). Denbigh chronology is poorly understood, resulting from the low archaeological visibility of often ephemeral sites and from very poor organic preservation in most contexts (Odess 2005). A few radiocarbon dates indicate that Denbigh people were in Alaska by 2500 cal B.C. (Slaughter 2005); however, they must have been present much earlier, based on comparison with the better-dated archaeological sequence in the eastern Arctic. Sites have been recorded in both coastal and interior locations, leading to the widely held interpretation that Denbigh is the first culture that was fully capable of making a living on the North American Arctic coast, at least on a seasonal basis (Giddings and Anderson 1986; Odess 2005; Tremayne and Rasic, this volume, chapter 14).

In the eastern Arctic, early Paleo-Inuit are known by three names. Across much of the Canadian Arctic and into Labrador, they are known as Pre-Dorset (Milne and Park, this volume, chapter 29), in northern Greenland and the High Arctic Islands as Independence I (Grønnow, this volume, chapter 30), and in much of west and east Greenland as Saqqaq (Grønnow, this volume, chapter 30). Existing archaeological

nomenclature, while sometimes linked to technological or typological phenomena (e.g., Schledermann 1990; Sørensen 2006), is based in large part on the history of archaeological research, and the region in which fieldwork occurs. For example, by convention the earliest Paleo-Inuit sites in Alaska are considered to belong to the Denbigh Flint complex, and in the central Arctic they are called Pre-Dorset, despite the fact that, in some cases, sites attributed to the two traditions may have been occupied over a very short time span time by essentially the same people, virtually identical in language, social structure, technology, and world view. Typological relationships are clouded by the fact that not all regions have seen high-resolution technological analyses of stone tools (the most common artifact category), and thus it is not always clear how much of the observed variability is due to “cultural” or “stylistic” differences, as opposed to cultural drift over time and the impacts of regionally variable lithic raw materials.

As they relate to the initial Paleo-Inuit migration, these three “traditions” are not equally well understood across their ranges, due to a host of factors including different research intensities and levels of archaeological visibility. Independence I is now reasonably well dated, with earliest dates indicating initial occupations at around 2400 cal B.C. (Grønnow and Jensen 2003). People of the Saqqaq tradition appear to have settled West and eventually East Greenland beginning at almost precisely the same time, around 2400 cal B.C. (Meldgaard 2004). However, because the region occupied by Pre-Dorset is so vast, with more variable levels of archaeological survey and excavation, until recently its chronology has been poorly understood (e.g., Maxwell 1985:77), though the southeasternmost extension of Pre-Dorset in Labrador may have also seen its first settlement around 2400 cal B.C. (Cox 2003).

Establishing the timing of the earliest Paleo-Inuit movement into the eastern Arctic is dependent on two main types of dating. First, in many regions the Arctic archaeological sequence is preserved on beach ridges created by isostatic processes. After the continental glaciers melted in the early Holocene, eastern Arctic land masses rose relative to sea levels, and therefore many coastal regions contain beach ridge sequences which get progressively younger, and lower in elevation, as they approach modern coastlines. Throughout the Arctic past, most human settlement occurred on the coasts, and therefore beach ridge elevations can be used to determine relative age, with recent sites at lower elevations near the coast, and older sites on higher beach ridges farther inland (though occasional exceptions to this pattern are expected).

The second form of chronological information comes from radiocarbon dates; however, in the Arctic they are subject to a series of problems. In particular, radiocarbon dates on bones of sea mammals (including polar bear) are subject to the marine reservoir effect, and therefore will return dates that are imprecise and too old; and dates on driftwood can be decades or even centuries too old if the driftwood sat on the beach for long periods before being used by ancient people. On the other hand, terrestrial mammal bone, particularly from caribou and muskox, is generally considered the best material for dating, since the death of the animal would ordinarily coincide closely with the occupation of a site. Where terrestrial mammal bones are not available, the best material for dating is the relatively common willow (*Salix*), which is a locally available woody

shrub. Willow was in many cases used by people as fuel shortly after the death of the organism, though in some cases a lag is possible between the death of the willow and its use by people. In addition, willow can live for over 200 years; and thus if inner rings are dated they can yield ages decades older than the outermost “living” growth ring of the plant. As a result, willow will often provide relatively accurate dates, but can sometimes be “too old” by an unknowable amount (McGhee 2009a).

Based on the integration of these two dating methods, recent research by James Savelle and Arthur Dyke in the central Arctic has added significant new data directly relevant to the timing and nature of the early Paleo-Inuit migration, and more particularly its earliest Pre-Dorset phases (Dyke and Savelle 2009; Dyke et al. 2011; Savelle and Dyke 2002, 2009; Savelle et al 2009). Through extensive survey in zones covering an east-west span of about 1,500 km, from western Victoria Island to the Foxe Basin, Savelle and Dyke have correlated radiocarbon dates with beach ridge elevations in order to understand major trends in early human habitation of the central Arctic. Most of the relevant radiocarbon dates are on driftwood or willow; for present purposes I will emphasize the willow dates due to their greater reliability. Taken as a whole, it is noteworthy that in several regional sequences the earliest willow dates cluster around 2800 cal B.C. (4200 B.P.); this provides a very conservative date for the arrival of Paleo-Inuit in the eastern Arctic. However, based on the few earlier willow dates from the region, and the fact that in many cases the highest in elevation (and therefore potentially earliest) sites in local sequences did not yield datable samples, a date of 3200 cal B.C. (4500 B.P.; Savelle and Dyke 2009) seems more likely; this latter date is supported by a date on a terrestrial mammal bone from Boothia Peninsula of 4486 ± 62 B.P. (Savelle and Dyke 2009:273). This date is consistent with estimates for the timing of the split between early Paleo-Inuit and Siberian populations, based on reconstruction of the genome of a Saqqaq individual (Rasmussen et al 2010). These earliest traces predating 2400 cal B.C., representing the pioneering Paleo-Inuit groups, will be called here “Initial Pre-Dorset” (cf. Helmer 1994). They are the presumed progenitors of all later eastern Arctic Paleo-Inuit groups, including Saqqaq, Independence I, and later Pre-Dorset.

Continuing fieldwork and expanded radiocarbon dating are leading not only to a better understanding of the timing and extent of early Paleo-Inuit population movements, but also to refined interpretations of other aspects of early lifeways relevant to the migration. Early Paleo-Inuit had a sophisticated portable technology allowing flexible responses to a range of Arctic environments. This included critical technologies such as skin tents, eyed needles for the production of tailored skin clothing, and small probably kayak-like boats (Meldgaard 2004). There is no clear evidence for other transportation technologies such as larger open boats or sleds, and therefore the migration probably occurred mainly on foot. Hunting technology included bows and arrows, spears, harpoons, and a range of other implements, making early Paleo-Inuit capable of acquiring a wide range of resources, including many mammal, bird, and fish species (Grønnow, this volume, chapter 30). However, they were particularly adept at hunting terrestrial and smaller marine mammals, with seals, caribou, and muskoxen dietary mainstays in many regions.

Most early Paleo-Inuit sites, from Siberia to Greenland, are relatively small. Many have only one dwelling, and a great majority have fewer than five (e.g., Dyke et al. 2011). A few larger sites exist, some of which may have been the locations for annual aggregations (Appelt 2006; Dyke et al. 2011), though the demonstration that large numbers of dwellings were occupied simultaneously will always be difficult. With notable exceptions, such as the site of Onion Portage in interior Alaska (Anderson 1988) and several coastal Saqqaq sites (Meldgaard 2004), most early sites were occupied relatively briefly, as inferred from low numbers of artifacts and ecofacts. This pattern is consistent with a high level of residential mobility, and may also reflect frequent shifting of group territories due to unpredictable or fluctuating resource distributions (Maxwell 1985).

Based on present evidence, little can be said about the pace of the migration in its early stages. Given an approximate date of 3200 cal B.C. for entry into the eastern Arctic, the expansion from Siberia into Alaska must have occurred somewhat earlier. The initial movement from Siberia to Alaska may not have required major adjustments, since the environments and resources available in both regions would have been quite similar, though it did entail the crossing of Bering Strait. The Alaskan picture becomes clearer at around 2500 cal B.C., when we see a variety of Denbigh site types, with interior winter settlements in semisubterranean dwellings (Anderson 2005), and warm-season occupations in both coastal and interior environments. It is also around this time (2500 cal B.C.) that more southerly areas of coastal Alaska were settled by Paleo-Inuit (ASTt) peoples (Dumond 2005).

We do not know if there was a hiatus following first settlement of Alaska, or if the migration saw relatively uninterrupted movement from Siberia through northern Alaska and into the eastern Arctic. It is clear, though, that the eastern Arctic would have presented new challenges and opportunities for the first migrants, due to a greater distance from the tree line, a different range of available resources, and a variety of new environmental conditions. In the eastern Arctic, Initial Pre-Dorset people arrived during the later phases of the relatively warm Holocene climatic optimum (Finkelstein, this volume, chapter 27), and may have found plentiful terrestrial game species such as caribou and muskoxen. Beginning with Steensby (1916), a number of researchers have speculated that early Paleo-Inuit were initially attracted to the region by the presence of muskoxen. Muskoxen can exist in high densities and are nonmigratory, meaning that they are year-round residents in many regions. Furthermore, for properly equipped human hunters, they can be relatively easy to kill. These facts lead to the potential for muskoxen both to draw populations into new regions and to be overhunted quickly, resulting in frequent territorial shifts to find unexploited herds (Maxwell 1985). However, it is important to recognize that early Paleo-Inuit were able to acquire a broad array of other resources including seals, caribou, fish, and waterfowl. Therefore, terrestrial mammals should not be emphasized to the exclusion of other taxa when interpreting early Paleo-Inuit lifeways; and in particular seals were the cornerstone of the economy in many locations (Darwent 2004). Furthermore, the early Paleo-Inuit site distributions reported by Savelle and Dyke (e.g., 2002) indicate that coasts saw relatively heavy settlement, presumably at least in part to allow access to sea mammals.

The migration might have been a gradual process in which each new region was populated in succession by subgroups “budding off” from growing populations in previously settled territories (Maxwell 1985; cf., Bottino 1987). However, due to the absence of other people in this uninhabited landscape, and the relative uncertainties inherent in an unknown environment, it seems likely that Initial Pre-Dorset peoples had patterns of settlement and mobility with no clear parallels in the ethnographic record. Such a lifeway may have involved extremely high levels of residential mobility combined with purposeful exploration of distant areas. At the same time, elaborate mechanisms must have been developed to maintain contact with other regional groups, in order to ensure access to marriage partners and economic security.

Was the migration a single continuous movement through the central and eastern Arctic to Greenland? Based on current evidence, and particularly the new dates from the central Arctic, one can tentatively suggest that there was a significant period (roughly 3200–2400 cal B.C.) during which Initial Pre-Dorset people occupied primarily the southern Arctic Archipelago and adjacent northern Mainland. Timing of the first occupation of Foxe Basin and areas to its east are less clear, in part because many surveyed beach ridge sequences do not include beaches dating as early as the Initial Pre-Dorset period (Savelle et al. 2009), and the Pre-Dorset penetration south into the Barren Grounds of the interior mainland is also very poorly dated. At the end of this period, a second phase of the early Paleo-Inuit migration led to the exploration and settlement of the High Arctic, Greenland, and Labrador around 2500–2400 cal B.C.. Thus, Independence I, Saqqaq, and later Pre-Dorset peoples were variants that diverged from this Initial Pre-Dorset base. The observed differences among these groups likely result in part from differential availability of important subsistence resources and lithic raw materials across the different regions (cf. Bielawski 1988). According to this interpretation, the similarities seen in material culture of Independence I in the High Arctic and Labrador Pre-Dorset (Cox 1978) result from their having originated from a similar technological base during this second phase of population expansion.

Currently, the reasons for this second phase of movement into the last unoccupied Arctic regions are unclear. However, three factors can be suggested. First, populations were apparently rising in the Initial Pre-Dorset area. Based on the density of dwelling features on dated beach ridges of different elevations, Savelle and Dyke (2002, 2009; Dyke and Savelle 2009; Dyke et al. 2011) have reported a widespread pattern in which population, as reconstructed from numbers of dwellings per beach ridge, gradually rose during the Initial Pre-Dorset occupation to reach a peak between roughly 2550 and 2100 cal B.C. (4000–3700 B.P.), with slight variability by subregion. Thus, populations may have been approaching or exceeding carrying capacity, leading to exploration of new territories. Second, there may have been a warming episode beginning around 2500 cal B.C., perhaps increasing the desirability of more northern regions (e.g., D’Andrea et al. 2011). Third, and somewhat more speculatively, perhaps the centuries spent in the Low Arctic allowed Initial Pre-Dorset peoples to develop the landscape knowledge, technologies, and social structures that allowed them to live in the more remote parts of the eastern Arctic. In particular, though the first Initial Pre-Dorset peoples must have been

reasonably proficient in the hunting of sea mammals, it seems possible that they further developed techniques of hunting seals at leads and breathing holes, from the ice edge, and perhaps from watercraft.

Ultimately, the factors leading to the initial phases of the migration are unclear, in part because the archaeological record is so fragmentary in the areas of Paleo-Inuit origins in Siberia and Alaska. Population densities must have been low across these regions, and no evidence currently exists indicating local conditions that might have led to a migration. Thus, it is most likely that these early Paleo-Inuit societies were drawn to the east due to the presence of relatively dense, untapped subsistence resources. Much of the scale and pace of the population movement was probably based simply on the fact that movements were always into sparsely inhabited (parts of Alaska) or uninhabited (eastern Arctic) regions, which saw little or no competition with other social groups.

THE THULE INUIT MIGRATION

By 200 cal A.D., and perhaps earlier (Mason 2009a; this volume, chapter 17), a new sequence of maritime-oriented societies known as Old Bering Sea, Punuk, Birnirk, and Thule, developed on the shores of Alaska and Siberia around Bering Strait (Figure 28.2).



FIGURE 28.2 Major regions of early Thule settlement in the North American Arctic. Regions labeled “Early Thule” were settled during the thirteenth century.

Map drafted by Matthew Walls

Collectively labeled the Inuit, Northern Maritime, Neoeskimo, or Thule tradition, these people were the direct ancestors of all modern Iñupiat, Inuvialuit, and Inuit. This tradition saw its fullest expression in the Thule culture, which developed in Alaska by around 1000 cal A.D.. Thule people spent their winters in substantial semisubterranean houses with sunken entrance tunnels designed to trap cold air. They traveled with the aid of dog sleds and umiaks (large open skin boats). Elaborate hunting technologies allowed efficient acquisition of virtually all potential resources, including sea mammals, land mammals, birds, and fish, and many communities successfully hunted walrus and large baleen whales. Social organization was increasingly complex, as seen in large permanent winter settlements, complex and frequent interaction marked by trade in a wide variety of materials, and intergroup conflict (Mason 2009b).

During the second millennium A.D., Thule people began to move eastward. For many decades, the Thule migration was believed to have occurred around 1000 cal A.D.; however recent reanalyses and new dates on terrestrial mammal bones indicate that in fact the migration occurred significantly later, likely during the thirteenth century cal A.D. (Friesen and Arnold 2008; McGhee 2000). The earliest Thule sites in the eastern Arctic contain several diagnostic artifact types, including specific arrowhead forms, and “Sicco” and “Natchuk” harpoon heads that exhibit traits associated with Punuk and Birnirk forms, respectively (Morrison 1999). Early sites are also marked by relatively high frequencies of ceramics, and houses with separate kitchen alcoves. These traits occur at Thule sites across a broad region, including Amundsen Gulf, Somerset Island, Foxe Basin, northern Baffin Island, eastern Ellesmere Island, and northwest Greenland (Friesen and Arnold 2008). Early sites are most densely concentrated in areas containing bowhead whales and walrus. However, zooarchaeological analyses clearly indicate that Thule people were capable of acquiring a broad array of marine mammals, terrestrial mammals, birds, and fish wherever they settled, and that ringed seals were often a dietary mainstay.

The Thule migration was remarkably rapid. There is no evidence for gradual movement through the eastern Arctic, with lengthy occupation in each new area to “adapt” or learn about local conditions. Instead, early Thule occupations appeared almost simultaneously from Amundsen Gulf in the west to Ellesmere Island and northwest Greenland in the east. The extraordinary pace of this migration is seen most clearly in the fact that the radiocarbon dates from each region are almost precisely equivalent. A rapid migration is also suggested by the fact that a ceramic sherd from the early Thule Skraeling Island site, located just off northeast Ellesmere Island near the northeastern limit of Thule expansion, had a chemical composition consistent with an Alaskan origin (McCullough 1989). Thule pottery is notoriously fragile, so it is unlikely that this pot could have survived transport for more than a few years.

The size of migrating populations is unclear, given the incomplete survey that has occurred, and the fact that sites containing early Thule occupations are often multicomponent, frustrating efforts to infer how many early houses were occupied at the same time (cf. McGhee 1984). Based on a variety of ethnographic analogs (e.g., Krupnik and Chlenov 2009; McGhee 2009b), most migrating groups were probably relatively small,

ranging in size from perhaps 15 to 50 people. They were likely organized around “compound families,” consisting of several related extended families, which were the most important social unit among nineteenth-century Iñupiat in Alaska (Burch 2006). Thule people probably traveled primarily by umiak during the summer open-water season, though it is also possible that they traveled by sled, or a combination of the two transportation methods. In fact, these advanced transportation technologies were critical to the migration, because they allowed early Inuit to transport the considerable volume and weight of their elaborate toolkits.

Early Thule assemblages exhibit variability in artifact form and decoration, which suggests that migrating Thule groups originated in more than one region of the western Arctic. In particular, the “Ruin Island” cluster of sites in northwest Greenland and adjacent regions of Ellesmere Island displays parallels to Punuk-related material culture from the Bering Strait region, while many other early eastern Thule sites show similarities to Birnirk-related settlements in northwest Alaska (Gulløv and McGhee 2006; McCullough 1989). These patterns remain an important unresolved aspect of the Thule migration, with their significance not completely clear, particularly since the north Alaskan coast saw some limited Punuk occupations in addition to its dense Birnirk settlement (Ford 1959; Mason, this volume, chapter 20). Furthermore, the two types of site (Punuk-related and Birnirk-related) appear at almost precisely the same time in the eastern Arctic, and a large proportion of their material culture is virtually identical. In fact, at least three early Thule sites, Nelson River (Friesen and Arnold 2008), M 1 (Collins 1952), and Mittimatalik (Morrison 1999), contain both Punuk-related Sicco harpoon heads *and* Birnirk-related Natchuk harpoon heads. Thus, early Thule ethnic identities were likely in flux, and all Thule migration episodes were probably linked at a general level, even though they originated in separate areas of a culturally and genetically diverse region consisting of north and west Alaska, and possibly also the poorly understood Siberian coast. The duration of these events is unclear—that is, we do not know if the migration was a tightly constrained series of a few population movements within a short period (McGhee 2009b), with all later eastern Thule resulting from the growth of a relatively isolated population, or if this eastern population was augmented by continued periodic immigration from Alaska.

A particularly thorny issue in studies of the Thule migration relates to the potential for interaction between newly arrived Thule groups and resident Late Dorset people, who were the descendants of the early Paleo-Inuit referred to above (Park, this volume, chapter 34). Recent research indicates that when the Thule migration occurred, Late Dorset were likely living in much of the eastern Arctic. In particular, multiple radiocarbon dates on terrestrial mammal bones from Late Dorset sites in southern Victoria Island (Friesen 2004; see also Savelle and Dyke 2002, 2009; Savelle et al. 2012) and northeast Greenland (Appelt and Gulløv 1999; LeMoine and Darwent 2010) indicate continuous Late Dorset settlement into at least the late thirteenth century A.D., though other regions were probably also occupied at this time (Appelt et al., this volume, chapter 33). Despite an apparent temporal overlap, there is very little direct evidence for interaction between Dorset and Thule in any form, either peaceful (e.g., trade or information

exchange as seen in artifact styles) or hostile (as seen in evidence of conflict) (Park 1993). Furthermore, ancient DNA analyses indicate a lack of extensive gene flow between Dorset and Thule (Raghavan et al. 2014). However, it seems likely that several categories of knowledge were transferred from Dorset to Thule, including techniques for snowhouse construction and breathing-hole hunting of seals, as well as the locations of spatially restricted raw materials such as iron, copper, and soapstone. While a lack of evidence makes interpretation difficult, the most likely scenario for interaction revolves around Late Dorset people actively avoiding Thule newcomers (Friesen 2000). Late Dorset simply could not compete with Thule, who had a more elaborate and specialized technology allowing them greater subsistence security. Furthermore, Thule technology included bows and arrows, which could be used in interpersonal conflict, and Thule had a more hierarchical social organization and experience with regional conflict from their origins in Alaska, and thus were better prepared to engage in territorial disputes. As a result, Thule appear to have displaced Late Dorset populations rapidly wherever they were encountered.

The conditions that triggered the Thule migration have been discussed at length (summarized by Friesen and Arnold 2008), with three major sets of factors often mentioned that would either “push” Thule people out of Alaska, or “pull” them to the east (cf. Anthony 1990). First, social factors in their Alaskan homelands may have created conditions encouraging people to leave. During the early second millennium A.D., the Bering Strait region was a patchwork of competing groups with diverse identities, linked through alliance, trade, and conflict (Mason, this volume, chapter 20). Furthermore, populations may have been relatively high, and reliant in many instances on a few key resources; a situation inviting risk if weather patterns changed or fluctuated (Mason 2009b:81). These social and economic conditions may have led to the emergence of status-seeking individuals or extended families who made the difficult choice to emigrate in order to create a better life. Furthermore, this situation may have led to tensions relating to feuds or demographic stress that forced some to flee (e.g., Arnold and McCullough 1990; Stevenson 1997). This potential motivation has a close analog in the mid-nineteenth-century migration of a party of Baffin Island Inuit to north-west Greenland, which appears to have been motivated largely by fear of revenge (Mary-Rousselière 1991).

A second set of factors that may have led to the migration revolves around the presence of key subsistence resources in the east as a potential draw for early Thule. In particular, bowhead whales are often seen as central to Thule economy, social organization, and ideology (McCartney 1980), and as early as 1927 their presence in the eastern Arctic was linked to the Thule migration (Mathiassen 1927). More recently, this hypothesis has been linked to climate change, with the Thule migration seen as coinciding with the warmer temperatures and longer open-water periods of the Medieval Warm Period (McGhee 1969–1970). In particular, it is thought that the Pacific and Atlantic bowhead whale populations may have expanded their ranges, and that Thule people relying on bowheads would have been drawn to the eastern Beaufort Sea, and then made a rapid move to the eastern Arctic upon learning of its unexploited bowheads (Morrison 1999).

Warmer temperatures could also have aided migration by increasing the length of the open-water season during which umiak travel was possible, and potentially opening water routes that were otherwise impassable.

The third potential factor suggested as leading to the migration emphasizes the desire for metal on the part of the earliest Thule migrants (Gulløv and McGhee 2006; McGhee 1984). This interpretation is based on the relatively widespread trade in and use of metal in the Bering Strait region, presumably leading to a desire on the part of Thule people for its acquisition for technological utility and social status. In fact, McGhee (2009a:161–162) has suggested that the Thule migration “took the form of mercantile exploration” with commercial motives. Metal was present in northwest Greenland as Norse iron and bronze, and as iron from the Cape York meteorites; and the fact that this distant region was settled very early in the migration process can be taken as indirect evidence for the role of metal in motivating the migration (Appelt and Gulløv 2009; Gulløv and McGhee 2006; McGhee 2009a; see also McCartney 1991 for consideration of the importance of metal in Thule society).

Discussion of these factors is hampered by the fact that there are no easy archaeological “tests” to disentangle them. For example, the presence of metal in early sites does not necessarily prove that metal was the primary factor leading to the migration; it may simply result from the well-established fact that Thule people valued metal and acquired it wherever and whenever they could. Likewise, evidence for bowhead whale hunting at early sites cannot be taken as proof that bowheads were the primary factor; it could simply reflect that wherever bowheads were encountered they were considered top-ranked prey due to their size and the prestige associated with their acquisition.

Despite the difficulties inherent in interpretation, the idea that the desire for metal was the primary factor in initially motivating the migration seems improbable, based on the fact that the eastward population movement appears to have begun before Thule could have had detailed knowledge of metal sources in the east. Recent redating of early Thule sites in the Amundsen Gulf and Beaufort Sea region, which is intermediate between west and east, indicates that they were first populated by Thule in the thirteenth century, around the same time that sites farther east were; thus the entire migration from west to east appears to have happened within only a few decades (Friesen and Arnold 2008). Given this timing, there is currently no mechanism for Thule of western Alaska to have learned about the metal sources in the east prior to the migration. If such a mechanism is discovered in the future, it still leaves open the question of whether the presence of distant metal would have been a powerful enough factor to motivate entire extended families to leave their familiar surroundings for a multiyear journey to the east.

However, the idea that bowhead whales were a major factor in initiating the Thule migration cannot be so easily discounted. Early Thule people would have had a clear understanding that there were large numbers of bowheads to the east of their Alaskan homelands. This is because the primary bowhead hunt in north Alaska occurs in offshore leads (wide cracks in the sea ice) during the bowheads’ spring migration to the Beaufort Sea. As a result, north Alaskans would have seen enormous numbers of bowhead whales disappearing to the east each spring and returning each fall (Spencer

1959). Thus, any decisions by Alaskan Thule populations to consider leaving their homeland would have been made with the knowledge that bowhead whales were abundant in the east. However, because the Thule migration occurred near the end of the Medieval Warm Period, it can no longer be considered to have been triggered by the *initial* expansion of bowhead populations induced by climate change. Rather, bowhead populations likely expanded centuries before the thirteenth-century Thule migration.

All of these factors suggest a scenario that differentiates the motivations for the *initiation* of the major population expansion to the east from the *speed* and *route taken* once the migration was underway. The migration was likely initiated by extended families from various locations along the north and west Alaskan and possibly Siberian coasts, who sought a better life away from their homelands where they may have been under economic pressure or subject to blood feuds or interregional conflict. While population movements probably proceeded in several directions, the way east would have been attractive due to preexisting knowledge of bowhead migration routes, quickly reinforced by reports from pioneering groups of other subsistence and technological resources.

Once the migration was underway, active exploration of new “frontiers,” possibly combined with information gleaned directly or indirectly from Late Dorset people (McGhee 2000), directed Thule migrants to the most promising areas farther east. Migrating groups would have searched for areas that allowed them a high level of economic security, and the means to maintain the social and ideological frameworks of their ancestral Thule culture. In particular, migrants would have initially sought locations that allowed accumulation and storage of large amounts of food to be consumed in sedentary winter villages. Areas conducive to the hunting of bowhead whales and perhaps walrus were likely favored due to the critical importance of these species to economic life and social status. As migrants made decisions about where to settle, other important factors would have included access to useful and prestigious materials such as iron, copper, ivory, and soapstone, and also relations with resident Dorset and Norse European groups. The distribution of sites containing Sicco and Natchuk harpoon heads, combined with radiocarbon dating evidence, indicates that this early settlement occurred in much of the central Canadian Arctic and northwest Greenland, including regions centered on Amundsen Gulf, Barrow Strait, Lancaster Sound, Prince Regent Inlet, Foxe Basin, and Smith Sound (Friesen and Arnold 2008).

DISCUSSION

The early Paleo-Inuit and Thule migrations both result from the actions of families deciding to leave familiar lands and move to new and relatively unknown regions. These decisions would not have been made lightly, and would have been based on a combination of factors; some that made their existing territories unattractive, such as

interpersonal conflicts or scarce subsistence resources, and others that made the new territories desirable, such as a perception of abundant subsistence or other resources. The two migration episodes share a number of characteristics, including their enormous scale, and the fact that both involved contending with the harsh Arctic environment. Both migrations also occurred during periods of relative warmth, which likely impacted the migrating populations by influencing resource availability and ease of transportation (for example, longer open-water periods would lead to easier boat transport).

Despite some similarities, the two migrations differ in significant ways. Most obviously, the early Paleo-Inuit migration traversed a completely uninhabited landscape, with no constraints imposed by potential interactions with other people. It is best interpreted as a geographic expansion of an Arctic society that was “pre-adapted” in terms of technology, social structure, and world view necessary for life above the tree line. Initial Pre-Dorset people entered an environment that encouraged exploration and movement over great distances. They took advantage of each new region encountered, possibly sometimes driven on by overhunting of local resources. It took almost a millennium for most areas of the Arctic to be populated, and the migration probably occurred in pulses rather than as a continuous gradual expansion. After initial movement through Alaska and into the central Canadian Arctic around 3200 cal B.C., a hiatus may have occurred, followed by further expansion as far as Greenland and Labrador by around 2400 cal B.C. At that time, the various regional populations began to differentiate based on local conditions, variant lithic raw materials, and simply cultural “drift” brought about by isolation, to become the archaeological traditions known as Independence I, Saqqaq, and the various phases and regional variants of Pre-Dorset (cf. Dekin 1976).

The Thule Inuit migration differed in many respects, not least of which was its rapid pace. At least some migrating groups appear to have traversed the entire Arctic within a single generation or less, and large portions of the eastern Arctic were settled within a century of the initiation of the migration. This speaks to both the speed of population movements and, perhaps, continued movement of western Thule to join their eastern relatives. The Thule migration also differed from its earlier Paleo-Inuit counterpart as a result of the high population levels and relative social complexity of the original Alaskan Thule societies. Thus, social or demographic factors such as conflict or resource shortfalls may have provided a strong “push” to migrating Thule groups. Furthermore, Thule entered a region occupied by Late Dorset societies, who were a potential source of information, conflict, and social unpredictability. Another difference between the two cases relates to transportation technology; umiaks and dog sleds allowed Inuit to explore and travel through much greater distances in a given year than their early Paleo-Inuit predecessors had been able to. With advanced transportation technology, hunting technology allowing exploitation of almost any Arctic environment, and a social structure emphasizing status and territoriality, Thule Inuit settled the eastern Arctic in a rapid wave, targeting the most productive regions and actively seeking useful and prestigious materials such as metal and ivory. In the process, Dorset people were pushed to the margins and eventual extinction.

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CHAPTER 29

PRE-DORSET CULTURE

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INTRODUCTION

THE Eastern Arctic (essentially Arctic Canada and Greenland) was populated approximately 4,500 years ago by Paleoeskimo immigrants from the region around Bering Strait. These very first inhabitants of the region are recognized archaeologically by culture names such as Independence I, Saqqaq, and Pre-Dorset. The Pre-Dorset, the subject of this chapter, are in some ways the most poorly understood of these early cultures, due both to circumstances created by the history of research and to the vast size and diversity of the regions in which sites ascribed to Pre-Dorset have been found. The first objective of this chapter is to broadly summarize what is presently known about the Pre-Dorset culture in the eastern Arctic, focusing on its geographic distribution, chronology, mobility, settlement and economy, social organization, and cosmology. The second goal of the chapter is to explore some of the difficulties inherent in defining Pre-Dorset based on material culture.

GEOGRAPHIC DISTRIBUTION AND CHRONOLOGY

Archaeological sites attributed to the Pre-Dorset culture are principally found in the Central and Eastern Canadian Arctic, including the mainland and archipelago. Sites are known from Banks Island in the west (Müller-Beck 1977; Taylor 1967) to Labrador in the east (Cox 1978; Fitzhugh 1976; Hood 2000; Tuck 1975) and from Ellesmere Island in the north (McGhee 1979; Schledermann 1990) to the Canadian subarctic Barrenlands (Gordon 1975; Meyer 1971) and the west and east coasts of Hudson's Bay (Nagy 1996; Taylor 1968) in the south. While some sites ascribed to Pre-Dorset have been located in

the High Arctic (e.g., Helmer 1991, 1992; McGhee 1979; Schledermann 1990), most are known from the Low Arctic.

Pre-Dorset sites have been identified in both coastal and inland locations. The coastal areas are characterized by both rocky coastlines incised by deep narrow fjords and wide gravel beaches with very low relief. Isostatic adjustments since the end of the last glaciation have gradually raised many former beaches well above today's coastline, in many areas forming distinct fossil beach ridges that have sometimes proven useful in determining the age of associated sites. Conversely, in areas like the east coast of Baffin Island, isostatic changes have submerged beaches dating to Pre-Dorset times. Inland sites are less well known, in part, because research has tended to focus more on coastal locations. However, several robust sites are known from the deep interiors of Banks and southern Baffin Islands, including Umingmak (Müller-Beck 1970; Taylor 1967) and Mosquito Ridge, LdFa-1, and LeDx-42 (Milne 2003a; Milne and Donnelly 2004; Milne et al. 2013), respectively. The interiors of these large islands are characterized by large lake and riverine systems, thus creating unique terrestrial environments that both human and animal populations found especially attractive. Other inland locations situated in closer proximity to neighboring sea coasts include the Crane Site (Le Blanc 1994) in the Mackenzie Delta and the Stanwell Fletcher Lake sites (Bielawski 1988) located on Somerset Island. These areas afforded easy access to both marine and terrestrial resources, hence making them highly desirable for human use.

The Pre-Dorset culture existed from 4500 B.P. to 2700 B.P. but accurately dating Pre-Dorset sites has proved problematic for decades in large part due to the lack of preserved organic materials in many Low Arctic sites. Among the earliest Pre-Dorset radiocarbon dates presently known are 4690 ± 380 B.P. from the Closure site (KdDq-11) on southeastern Baffin Island, 4545 ± 155 B.P. from Mittimatalik (PeFr-1) on northern Baffin Island, and 4118 ± 168 (B.P.) from the Kaleruserk (NiHf-1) site near Igloolik (Canadian Archaeological Radiocarbon Database). While these early dates are normalized, they do derive from sea mammal remains and are thus subject to the controversies surrounding the marine reservoir effect. More recently obtained early Pre-Dorset dates from preserved caribou bone collagen include 4290–4080 B.P. (Beta-175504) from Mosquito Ridge (MaDv-11), 4100–3830 B.P. (Beta-208147) from LdFa-12, and 4080–3850 B.P. (Beta-246445) from LdFa-1 (all dates from the interior of southern Baffin Island, calibrated 2σ). Similarly, Saville and Dyke (2002) have recorded numerous early dates from surface-collected samples of charcoal and shell from Pre-Dorset sites on Victoria Island, including 4427 ± 52 B.P. from the 00DCA144E site on Woodward Point and 4490 ± 90 B.P. from the 99DCA158b site on Innirit Point.

The Pre-Dorset culture period is often further subdivided into Early, Middle, and Late. Frequency seriation based on the presence or absence of specific lithic artifact types (e.g., microblades, burins, burin spalls, stemmed and triangular endblades) and the varying degree of stylistic or functional treatments they display (e.g., polish, grinding, notching, edge serration) have played a significant role in establishing the criteria used to classify sites into these temporal categories. Moreover, harpoon heads, where preserved, settlement structure, and site elevations above sea level are also used.

Maxwell (1985:107, 109) attempted an initial temporal subdivision for the Pre-Dorset culture period based on his analysis of sites in the Lake Harbour District, yet at the time he acknowledged the existence of gaps. More recently, Murray (1999:467) presented a refined version of Maxwell's temporal framework that includes the following dates: Early Pre-Dorset 4450–3650 B.P.; Middle Pre-Dorset 3650–3250 B.P.; Late Pre-Dorset 3250–2750 B.P.; and lastly Terminal Pre-Dorset, which is also sometimes referred to as the “Transition” period, 2750–2450 B.P. During the three centuries encompassed by the Transition, the Pre-Dorset culture appears to have experienced rapid internal changes, presumably linked to an increasingly colder climate, which culminated in the emergence of the descendant Dorset culture in the archaeological record. Dating sites from the Transition has proved especially problematic since few of them have good preservation of material suitable for dating purposes. As a result, it is not uncommon for sites to be subjectively classified as Transitional solely on the basis of frequency distributions of specific artifact types, including, for example, the co-occurrence of spalled burins and burin-like-tools.

Researchers have found applying many of these criteria to date Pre-Dorset site remains difficult and confusing, since rarely are all of the cited diagnostic material remains found together in one location (Maxwell 1985:107). As such, classifying sites as Early, Middle, Late, or Transitional remains a challenging and, arguably, idiosyncratic endeavor, since it relies to a large extent on individual assessments of diagnostic artifacts and their corresponding expressions of stylistic treatments. And, as more detailed technological analyses are conducted on Pre-Dorset lithic artifacts, questions about the utility of these early typologies have been raised. It increasingly appears that these “diagnostic” attributes have more to do with technological organization, and raw material selection and use strategies than they do with culture change and chronology.

TECHNOLOGY

Pre-Dorset technology was based on a limited range of materials: flaked stone, ground stone, bone, antler, ivory, skin, and driftwood. Preservation problems at most Pre-Dorset sites means that the nonlithic component of their technology has been studied much less thoroughly than the implements manufactured out of stone. One of the most distinctive and common flaked stone implements is the spalled burin, used as a chisel or scraper to manufacture items out of bone, antler, ivory, or wood (Maxwell 1985:91–94). Other flaked stone tools associated with manufacturing or maintenance include graters, microblades, sidescrapers, endscrapers, stemmed and lanceolate knives, stone adzes, and drills (Bielawski 1988; Maxwell 1985). Pre-Dorset hunting technology includes harpoons and lances that could be used for hunting sea mammals from the edge of the landfast ice, or ringed seals through their breathing holes. Harpoon heads include both the toggling variety, with open sockets, and a small number of the nontoggling variety (Helmer 1991:309). Lances and the bow and arrow were used for hunting land mammals

(Maxwell 1984:361). The flaked stone items associated with these hunting implements include concave or square-based triangular endblades, straight-stemmed endblades and bifaces, and bipoined sideblades (Helmer 1991:309; Maxwell 1985:68).

MOBILITY, SETTLEMENT PATTERNS, AND ECONOMY

Interpretations of Pre-Dorset lifeways are structured by assumptions of seasonal mobility, as groups moved across the landscape to exploit seasonally available resources in different locales (Bielawski 1988:56–57). The degree of mobility in accordance with these seasonal moves presumably fluctuated between periods that were highly nomadic, when journeys were made between winter and summer areas, and those that were more sedentary, when people stayed put once they had reached their desired destination. The distances covered during these seasonal movements undoubtedly varied regionally due to local geography; but generally they are interpreted as having been considerable, given the ephemeral nature of many Pre-Dorset sites (Murray 1999:468).

Regional variability in Pre-Dorset mobility is similarly reflected in the variable settlement patterns identified for this culture throughout the eastern Arctic. In some areas there is evidence indicating populations followed an annual seasonal round which saw them camping and hunting in the interior during the summer and autumn, and spending the remainder of the year near the coast and, probably, out on the sea ice (Maxwell 1985:98; Milne 2003a; Schledermann 1990:318). However, some coastal sites have been reliably attributed to summer or autumn occupations through tooth thin-sectioning (Helmer 1991:309). Areas near polynyas appear to have attracted more intensive multi-seasonal occupations (Schledermann 1980:298), while the lack of refuse among other occupations suggests they were only briefly used (Maxwell 1985:98). Elsewhere, there is evidence that some groups may have spent most or all of the year in one locality, moving only short distances seasonally between nearby campsites to take advantage of local topographic differences (McCartney and Helmer 1989; Ramsden and Murray 1995).

Pre-Dorset site structure varies from clustered dwelling arrangements (McGhee 1979) to those that are approximately linear (Schledermann 1978:56). Most campsites contain between one and three dwellings, indicating small co-resident groups. Most sites larger than that appear to have been occupied for brief periods only (McGhee 1996:123). Therefore, local hunting bands probably consisted of from three to five families, or perhaps 15–20 people, for parts of the year, separating into individual families at other times (Dyke and Savelle 2009; Maxwell 1985:52). The entire Pre-Dorset population was undoubtedly very small.

Pre-Dorset dwellings included skin tents supported by a framework of poles. The remains of individual tents often exhibit a circular or oval ring of gravel or of small boulders, used to hold down the skirts of the tent, but there is enormous architectural

variability (Ryan 2003). They range in size from over 4.5 meters in diameter to small ovals 2 meters long and 1.5 meters wide (Bielawski 1988; Helmer 1991:305; Maxwell 1984:362). The majority appear to have been single-family dwellings based on size and the arrangement of interior features (McGhee 1979:55). Within each structure there may be a hearth constructed of flat stones or simply a nondescript cluster of rocks containing small quantities of charred material. Mid-passages with box hearths may occasionally be found at Pre-Dorset sites, but are rare (Maxwell 1985:97; Schledermann 1990:119, 323). Sutherland (2003:197) suggests that the small, round soapstone lamps that have also been found at some Pre-Dorset sites (Mary-Rousselière 1976:41; Maxwell 1984:361) are the explanation, replacing open fires in hearths for heat and illumination. Some Pre-Dorset structures lack an encircling rock or gravel ring. These have been interpreted as winter dwellings, containing either snow houses or tents banked with snow (Helmer 1991:305; Ramsden and Murray 1995; cf. Schledermann 1978:48).

The Pre-Dorset took advantage of both land mammals and sea mammals in order to meet their food and material requirements. Dogs were probably used in a range of hunting activities, but they do not appear to have been abundant and there is no evidence for dog traction (Morey and Aaris-Sørensen 2002). Where quantifiable, seals appear to have been the most important component of the Pre-Dorset diet, although faunal assemblages also contain migratory birds, fish, and other mammals (McCartney and Helmer 1989; Maxwell 1985; Milne and Donnelly 2004). While McCartney and Helmer (1989:145) note that the terrestrial component of the Pre-Dorset adaptation is the least well known due to a lack of preserved organic materials, sites on Banks (e.g., Umingmak) and southern Baffin Islands (e.g., Mosquito Ridge, LdFa-1, and LeDx-42), and in the Mackenzie Delta (e.g., Crane) and subarctic Barrenlands demonstrate that Pre-Dorset hunters were extremely effective at hunting caribou (see Gordon 1996; Le Blanc 1994; McAvoy 2014; Milne et al. 2013; Münzel 1983; Taylor 1967:227).

SOCIAL ORGANIZATION

The social organization of the Pre-Dorset people would have been based on small, flexible egalitarian bands linked by ties of kinship or partnerships. The nuclear family would have been the most important unit, but undoubtedly a number of families would normally have cooperated closely together during some or much of the year (McGhee 1996:122–125). However, there is some disagreement among researchers concerning the extent to which distinctive local regional groups may have existed, or whether individual bands were highly mobile over long distances, producing the technological homogeneity that is observed over the vast region (Helmer et al. 1996:316). There is no evidence that the Pre-Dorset had more than very sporadic contacts with peoples to the south. In northern Labrador it has been argued that Pre-Dorset peoples acquired a particular type of toggling harpoon from the Maritime Archaic people there, who, in turn, acquired bow and arrow technology from the Pre-Dorset (Tuck and Fitzhugh 1986:162–163). A more recent

date of 5500 B.P. for this bow and arrow technology, as described by Hood (2000:128), calls this contact into question, since this predates the region's Pre-Dorset occupation. Moreover, Hood's continuing research in this area indicates that Labrador Pre-Dorset populations made a concerted effort to create spatial partitioning so as to maintain social boundaries with their southerly Maritime Archaic neighbors. This social buffering effectively prevented any notable cultural transmission between these distinct populations (Hood 2000, 2008). In the western Arctic, there is some evidence of contact with the Alaskan Choris or Norton cultures late in Pre-Dorset times (Le Blanc 1994:115–116).

The poor preservation of organic artifacts at most Pre-Dorset sites means that we know little about ornaments and ornamentation. A few organic items have been found incised with geometric designs or depictions of birds, fish, seals, and caribou (Maxwell 1985:95–96; Schledermann 1990:106; Stenton and Park 2003). A carved human maskette depicts tattooing very similar to that known from Inuit in the Historic period (Helmer 1986). These findings suggest that the distinctive carvings of the Dorset tradition, which developed out of Pre-Dorset, had their antecedents in the earlier culture. Thus, the shamanic beliefs attributed to the Dorset on the basis of their art (McGhee 1996:155) presumably date back to Pre-Dorset times as well. Practically nothing is known about Pre-Dorset attitudes or practices concerning death. Presently, the only confirmed human remains recovered from a Pre-Dorset site include the bones of a premature infant from Devon Island (Helmer and Kennedy 1986).

PRE-DORSET SITES

The following examples illustrate the diversity of sites that have been assigned to the Pre-Dorset culture over the years.

Kapuvik

Jens Munk Island, containing the Kapuvik site, is located off the coast of Baffin Island at the north end of Foxe Basin. The waters of Foxe Basin are especially rich in sea-mammal resources, including walrus and bearded seal, in addition to smaller seals. The island exhibits a long sequence of heavily weathered limestone beach ridges, the result of approximately 50 meters of essentially continuous uplift over the past 4,000 years (Meldgaard 1960a:67, 73; 1960b:588). The emerging beaches at Kapuvik were occupied successively by people of the Pre-Dorset, Dorset, and Thule cultures. Because each group of people tended to camp near the shoreline, the Pre-Dorset finds are today on the uppermost beach ridges, at elevations of 54 to 23 meters, whereas the later occupations are found on lower beach ridges, below 22 meters above sea level (Meldgaard 1962).

Because Kapuvik was occupied essentially continuously over millennia, and because the extreme degree of isostatic uplift in this region has produced unusually good

horizontal stratigraphy, it provides important information concerning Pre-Dorset technology, continuity and change over time, and its relationship with the succeeding Dorset tradition. Pre-Dorset lithics from the site include small burins, some of which are ground on the sides, small symmetrical endblades for arrows, and microblades. Organic artifacts include open-socketed toggling harpoon heads, lance heads, flint flakers made of seal baculums, and ivory sewing needles with circular cross-section, round eyes, and blunt heads. There is little evidence of technological change from the earliest Pre-Dorset beaches to the latest, except for what the original excavator characterized as decreasing quality of workmanship. In the very latest Pre-Dorset beaches harpoon styles change in ways that foreshadow Dorset tradition types, nephrite enters use, and a maskette similar to Dorset ones occurs. The site thus provides useful data concerning the transition from Pre-Dorset to Dorset at the time represented by the 22- and 23-meter beach ridges. Kapuivik is also one of the sites that gave rise to the notion of a “core area” of Pre-Dorset and Dorset development, within which there was continuity of occupation. However, the recent work of Savelle et al. (2009) at the site has raised questions of whether continuity at this site is indeed evident.

Port Refuge

The Port Refuge site (McGhee 1976, 1979) is located on the south coast of the Grinnell Peninsula, Devon Island. The site contains archaeological remains ascribed to both the Pre-Dorset and the Independence I cultures, situated on raised limestone gravel beach ridges that surround the small sheltered bay from which the site takes its name. Due to isostatic uplift the sites are over 20 meters above sea level today, but it is assumed that at the time they were constructed they were very near the shore. The ice in the bay would have formed earlier in the autumn and lasted longer into the summer than that outside the bay, making this a good location for hunting sea mammals from or on the ice. A polynya that forms in the ocean not far from Port Refuge may have provided an important additional inducement to occupation here.

The site contains three early Paleoeskimo components, in addition to later Independence II, Dorset, and Thule remains. The Upper Beaches component at the southwest corner of the bay and the Cold component at its head derive from Independence I, whereas the Gull Cliff component, just east of Upper Beaches, is assigned to Pre-Dorset. The Gull Cliff component covers an area approximately 200 by 100 meters, at an elevation of between 18 and 25 meters. It contains 20 dwellings as well as 16 additional features and midden scatters. Surface collection and excavations at all three components produced abundant lithics plus some organic artifacts and faunal remains. The Independence I components contained lightly built mid-passage structures arranged linearly in groups of 5–20 houses, and box hearths, along with more nondescript structures. The Pre-Dorset structures lack mid-passages and are situated in clusters of two to five houses.

Both winter and summer occupations at this location are inferred. Similar faunal remains from both the Independence I and Pre-Dorset components document the

overwhelming importance of ringed seals in subsistence. Most importantly, Port Refuge is the single site which best exhibits a sharp contrast between the Independence I and Pre-Dorset subtraditions in settlement pattern, material culture, and age. Given the difficulties associated with radiocarbon dating Arctic sites, the separation in elevation seen between the Independence I and Pre-Dorset occupations here provides the best evidence for the temporal priority of the former (perhaps on the order of 300 years), and has been used to argue that Independence I represents a migration of people into the Canadian Arctic separate from that which produced Pre-Dorset (McGhee 1979:87).

Bettison Point

Located at the northeast corner of Prince of Wales Island, Bettison Point (Ramsden and Murray 1995) is a low gravel promontory extending from the north shore of Back Bay. It is relatively sheltered from both winds and currents, and overlooks both the bay itself and Peel Sound, the waters of which are generally frozen from November through July. The Pre-Dorset occupation at Bettison Point consists of 13 components. Eight are situated on top of a gravel ridge around a large pond at an elevation of between 21 and 24 meters above sea level, while the remaining five are located just a few hundred meters away on south-facing beaches between 14 and 20 meters in elevation. One of the beach components contains 16 structures; all other components contain from one to seven structures. All the excavated structures contained lithic artifacts; some also contained organic artifacts and faunal bones. Despite displaying considerable variability, 44 of the 45 dwelling structures identified at Bettison Point could be assigned to two types. The 32 Type 1 structures dominate the beach components. Each structure consists only of a cluster of small flat or irregular stones and moss, averaging about 4.5 m² in area. The 12 Type 2 structures, which are found only in the ridge components, are well-defined tent rings exhibiting internal features and average about 21 m² in area.

The Type 2 structures have been interpreted as warm-weather dwellings on the basis of three factors: (1) the large stones used to weigh down the tent would have been exposed and available (i.e., not frozen into the ground); (2) migratory waterfowl remains are consistent with a warm-season occupation; and (3) the windy ridge-top location would be unappealing in winter but advantageous for insect-avoidance during the summer. Conversely, the Type 1 structures are interpreted as winter dwellings. Their lack of a stone or gravel perimeter ring suggests that snow was the only construction material, or was used to anchor a skin tent. Their location in the lee of a steep slope is considered ideal for snow structures, and the faunal assemblages lack summer species. Bettison Point thus appears to have been utilized by a small hunting band throughout much of the year, either continuously or intermittently. Factors which may have led them to move between the beach and ridge components may have included such things as the accessibility of food, water, and building materials, prevailing winds, and insects. The number of structures suggests a total occupation of a decade or less, assuming that each dwelling was occupied only once.

Umingmak

The Umingmak site (Hahn 1977; Müller-Beck 1977a, 1977b, 1977c; Taylor 1967) is situated in the northern interior of Banks Island, and when occupied, probably lay on a small rise at the edge of Shoran Lake near a small creek draining into it. Parts of the site are heavily vegetated whereas others are bare. Permafrost resulted in good organic preservation, although the site was somewhat disturbed in places due to ice wedges and cryoturbation.

Excavation in two areas within the large site revealed evidence of three rock hearths, one partially encircled by muskox skulls and rocks, perhaps forming windbreaks, plus a probable midden deposit. The excavations at Umingmak produced a wide range of lithic and bone artifacts, the latter including some of the few decorated bone objects known from Pre-Dorset, consisting of incised geometric designs and depictions of birds and caribou (Campen 1977; Müller-Beck 1977a). The name of the site, the Inuktitut word for muskox, is very appropriate. Over 80 percent of the faunal remains derive from muskox, with the remainder coming from caribou, arctic fox, arctic hare, birds, and fish. The scale of muskox hunting here is indicated by the fact that surface inspection revealed 73 muskox skulls at the site; more were found during excavation. Based on muskox ecology it appears that both whole herds and solitary animals were hunted. Intensive processing of the carcasses is evident from butchering marks and the consistent breakage of all bones containing marrow (Münzel 1988). Combining ethnographic analogy with the nature of the structures and faunal remains, the site is interpreted as a summer camp where supplies of dried meat were prepared for winter.

LdFa-1

Located in the deep interior of southern Baffin Island, LdFa-1 is an expansive archaeological site strategically situated near a naturally occurring narrow on the northwest shore of Mingo Lake. This narrow sees significant caribou traffic where large numbers of animals habitually cross from the lake's southern shore to the north. When they exit the water, the caribou immediately face the Mingo Lake esker—a steep glacial feature extending several kilometers along the lake's northern margin. As the animals exit the water they are virtually blind to what lies above them, thereby providing hunters with an ideal situation to dispatch them as they ascend the esker to move overland down its other side. There are at least three large hunting blinds situated within 100–150 meters from LdFa-1, and the dominance of caribou in the faunal assemblage from the site indicates that these animals were the main quarry throughout its extensive occupation.

LdFa-1 is a multicomponent site, containing Pre-Dorset, Dorset, Thule, and Inuit occupations. Two tent rings—one lightly constructed (4.7 m × 3.9 m) and one heavily constructed (2.9 m × 3.4 m)—that were directly adjacent to one another were excavated. The artifacts were characteristically Pre-Dorset, as were the radiocarbon dates obtained

from their associated caribou remains (e.g., 3600–3410 B.P., calibrated 2 σ). This Pre-Dorset component is spatially separated from the other cultural occupations at the site and yielded an exceptionally large lithic assemblage that included spalled burins, burin spalls, bipointed and contracting stemmed endblades exhibiting delicate edge serration, expanding endscrapers, sidescrapers, sideblades, microblades, cores, and organic artifacts including bone needles, worked walrus ivory, and a delicate caribou incisor depicting an image of a human face. The faunal assemblage indicates a near-exclusive exploitation of caribou, despite the availability of other seasonally optimal resources in the area, namely avifauna and fish.

The extensive and repeated occupation of LdFa-1 over the millennia attests to the site's exceptional location for resource extraction, including chert toolstone. The debitage assemblage collected from the site numbers over 100,000 flakes, with much of the site still intact for future exploration. Given the availability of lithic raw material in this region of the southern Baffin Island interior (ten Bruggen et al. 2015), it is highly likely that a major pull for Pre-Dorset populations to the interior was the acquisition of usable toolstone, in addition to abundant and easily acquired caribou, and opportunities for interregional socialization (Milne 2003a, 2005, 2012).

DEFINING PRE-DORSET

Based on the information presented thus far, Pre-Dorset, as an archaeological culture, is arguably difficult to define and discuss as a single cohesive entity. This is due both to the history of research into the culture and to the fact that early attempts to identify defining traits were based on a limited number of sites, such as the ones above, from divergent geographic areas throughout the eastern Arctic.

Speculation about the existence of a Stone Age culture in the eastern Arctic began in the late 1800s as early explorers, including those from the Danmark Expedition and Fifth Thule Expedition, encountered the remains of ancient stone tools in archaeological sites extending all the way from Greenland to Alaska (Meldgaard 1996). Hans Peder Steensby's (1916) stratified model of Arctic prehistory labeled these early stone-tool makers as Paleoeskimos, and he described them as subarctic muskox hunters who migrated into the Arctic proper in search of new herds. Diamond Jenness's (1925) pioneering work on artifact assemblages from the Cape Dorset region of Baffin Island, and Coats and Southampton Islands provided evidence in support of Steensby's (1916) Paleoeskimos. However, Jenness argued that his identified Cape Dorset culture (now known as Dorset) was not the oldest in the eastern Arctic and that eventually researchers would find its progenitor. Several decades later, Henry Collins' (1956, 1957) work at the T 1 site on Southampton Island revealed the existence of a "previously unknown phase" of Dorset, appearing to confirm Jenness' earlier prediction.

Collins (1956, 1957) called this manifestation "proto-Dorset" or "pre-Dorset"—a term that was meant to indicate that there existed a population antecedent to Dorset

that was temporally and typologically distinct, even if it was not yet possible to define it based on a distinct set of criteria. Artifact remains found in the Arctic at this early stage of research that were not clearly Dorset or Thule were considered to be "Pre-Dorset," and eventually the term became a kind of archaeological catch-all category. Shortly thereafter emerged a second interpretation of Pre-Dorset and that was grounded in William Taylor's work (1968) in Nunavik, along with Moreau Maxwell's (1973) on southern Baffin Island. Taylor and Maxwell viewed Pre-Dorset as a distinct cultural entity that was principally found in the central low Arctic islands and mainland. Moreover, they argued that Pre-Dorset was ancestral to Dorset, and that a cultural transformation of some sort took place, thereby linking both entities in a single cultural continuum. The culmination of this early work saw these two interpretive models variously applied by archaeologists as they continued to discover new sites throughout the eastern Arctic.

Defining Pre-Dorset in such a way as to reliably distinguish it from the other early Arctic Small Tool (ASTt) cultures in the Eastern Arctic is further complicated by the fact that many sites were assigned to that culture based on Collins' model of classification. Sites from as far west as Banks and Melville Islands (Umingmak, Shoran Lake, Lagoon) and the Mackenzie Delta (Crane), north to Devon and Ellesmere Islands (Port Refuge, Truelove Lowlands, Bache Peninsula), south to the subarctic Barrenlands (Bloody Falls, Dubawnt Lake, Seahorse Gulley), and east to Nunavik (Arnapik) and Labrador (Thalia Point, Saglek Bay) were in many cases uncritically classified as Pre-Dorset. Given the pioneering nature of the research into the early occupations of this vast region and some basic similarities between the finds from all of these sites, this approach made sense, but the subsequent investigation of more and more "Pre-Dorset" sites within this vast area has also highlighted some notable differences among their respective assemblages. This should not be unexpected since the enormous geographic expanse unavoidably meant that artifact assemblages would display regional variability given the diverse range of environments and site types that were lumped into one cultural category. Further, the existence of different cultural traditions that occupied neighboring areas raises the possibility of acculturative differences, as noted already.

For example, the westernmost Pre-Dorset sites are described as showing traits indicative of interaction with the Norton culture because geographically, they are not far from Alaska, where Norton is most widely recognized (Le Blanc 1994:115). Similarly, some Pre-Dorset sites from Labrador appear to share characteristics with neighboring Saqqaq from western Greenland and Independence I from the High Arctic Islands (Cox 1978; Fitzhugh 1976; Tuck 1975). Among Pre-Dorset sites located in the subarctic Barrenlands and northern Boreal Forests, the appearance of unusual woodworking tools, among other items, is taken to indicate possible influences from Na-Dene groups who bordered the southern extent of the Pre-Dorset range in Manitoba and Saskatchewan (Gordon 1975; Meyer 1971). Therefore, with all of these potential sources for variability that go beyond differential availability of material and subsistence resources, and microenvironmental conditions, it was increasingly difficult to reliably and consistently define

Pre-Dorset in a way that allowed archaeologists to recognize *both* significant cultural similarities *and* significant differences.

Maxwell (1973:299–300) recognized this fact and attempted to define a preliminary typology with the objective that it might lead to the recognition of Pre-Dorset as a more cohesive entity. Maxwell's (1985) efforts focused on a basic set of characteristics derived largely from sites located in his proposed "core area" of development. Then, to address the variability noted between sites located there and in the neighboring "fringe areas," he described populations as being regional ASTt variants, which also included Saqqaq (Maxwell 1985:103–106). However, even with this preliminary typological framework, it was in fact McGhee's (1976, 1979) work at Port Refuge that seemed to more clearly define Pre-Dorset based not so much on the traits that assemblages ascribed to it exhibited, but rather on what they lacked in comparison to the Independence I components McGhee had identified from the same area. McGhee (1979:107–114) astutely noted in his analysis that variation attributable to individual skill and preference has some bearing on similarities and differences in the artifacts he examined. However, he still argued there were enough differences to warrant a distinction in cultural classification among the various components located at Port Refuge. Pre-Dorset was interpreted not only as being unrelated to Independence I, but also as part of a later ASTt migration into the eastern Arctic.

Archaeologists do agree that Pre-Dorset, as a distinct cultural entity, existed in the Low Arctic islands and mainland; however, the question of its cultural affiliation with other early ASTt groups continues to be problematic. For example, researchers working in Labrador believe that the early ASTt sites found there are more closely related to Independence I from northern Greenland and the High Arctic islands than they are to Pre-Dorset. Moreover, archaeologists working on sites in eastern Nunavik argue their material is most similar to that from Labrador and, by extension, northern Greenland and the High Arctic. Consequently, the two models used historically to classify Pre-Dorset (i.e., as archaeological catch-all category versus a distinct entity that is ancestral to Dorset and found in the low Arctic regions) are still in use today depending on where in the Arctic people are working.

More than two decades ago, Bielawski (1988) presented a synthesis of McGhee's (1979) work at Port Refuge and discussed its impacts on how early ASTt remains, particularly those classified as Pre-Dorset, have been perceived and interpreted by Arctic archaeologists. She noted that new site evidence at that time from Devon Island, Ellesmere Island, Prince of Wales Island, Roche Bay, and Somerset Island indicated that the distinctions between the early ASTt variants defined in the eastern Arctic, namely Pre-Dorset and Independence I, were "blurry" and had not "withstood the test of further finds" (Bielawski 1988:54, 70). More recent site evidence from Igloodik and southern Baffin Island appears to further corroborate this assertion. An examination of the criteria used by archaeologists to classify Pre-Dorset sites is necessary to illustrate that in fact those traits that have been used to separate it from other early ASTt variants, namely Independence I, are not as clear cut as they once appeared, given the continued discovery and analysis of Pre-Dorset sites throughout the eastern Arctic.

DEFINING TRAITS OF PRE-DORSET CULTURE

Researchers have proposed a range of traits to define Pre-Dorset, though not all are still considered reliable. They include the following: clustered settlement patterns; dwellings lacking defined hearths and mid-passages; toggling harpoon heads, where preserved (McGhee 1979); radiocarbon dates more recent than 3700 B.P. (McGhee 1979; Tuck 1975); smaller lithic tools with thicker cross-sections and lacking edge serration; bifaces with straight stems (McGhee 1979:124); and, the use of nondescript toolstones, namely tan cherts (Maxwell 1973:296). Those items that occur but are rare include burin-like tools; ground slate tools; sideblades (sometimes asymmetrical in outline); very small, narrow and finely serrated straight-based triangular projectile points; and, side- or corner-notched bifacial knives (Maxwell 1973). The occurrence of polish varies among these types, as does the quality of flaking (McGhee 1979; Maxwell 1973; Tuck 1975).

Those traits that are deemed *not* to occur in Pre-Dorset sites, and thus also serve to define this culture in comparison to Independence I and Labrador early Paleoeskimo, include: dwellings with a central mid-passage and box hearths that are arranged linearly; nontoggling harpoon heads; radiocarbon dates of 3700 B.P. or older; a tendency for chipped stone tools to be large in their overall dimensions, thin in cross-section, and to display fine edge serration that is sometimes deep and invasive across the tools' dorsal and ventral surfaces; the presence of contracting stemmed or bipointed bifaces; and large flared endscrapers (Cox 1978:98, 102–103; Tuck 1975:145–148). Polish and grinding on burins and bifaces are absent, as are ground slate tools (McGhee 1979:123).

Settlement structure is not a clear indicator of cultural distinction as discussed by Mary-Rousselière (1976:53), Schledermann (1978:53, 56), and Bielawski (1988:55, 61), since the presence or absence of beach ridges in an area is a stronger determinant than cultural preference as to whether dwellings will be linearly distributed or clustered. Bielawski (1988:57) also notes that the phenomenon of dwelling cannibalization by later inhabitants in a site area to acquire building materials for new structures will obliterate the presence of mid-passage features and/or box hearths, making them undetectable at a site even if they were once present. As such, it can be argued that this is not a suitable indicator for classifying early ASTt materials, particularly in places like the low Arctic where the greatest concentration of Pre-Dorset sites is found and where factors including extensive rock outcrops, low-lying wetlands, and thick surface vegetation limit suitable camping areas, thereby increasing the potential for this kind of postabandonment disturbance.

The impact of differential preservation on the organic component of early ASTt sites is widely recognized, particularly among the low Arctic Islands and mainland areas. Therefore, while a notable distinction was made by McGhee between Independence I and Pre-Dorset harpoon heads at Port Refuge, use of this artifact type is limited for drawing direct comparisons, since it is not consistently preserved in all areas and may give a false impression of technological differences when, in actual fact, it more accurately reflects negative evidence. Moreover, we cannot assess if seasonal and/or

functional differences among sites are linked to these distinctions in harpoon head technology.

If site structure, dwelling features, and harpoon heads are removed we are left with radiocarbon dates and lithic tools to classify early ASTt sites. Organic preservation issues in early ASTt sites also impact efforts to accurately date sites since suitable raw materials for doing so are frequently unavailable. That said, there are dates from Pre-Dorset sites that predate the 3700 B.P. baseline used to distinguish it from Independence I at Port Refuge and Labrador early Paleoeskimo. Of particular interest are the dates from the Ice-Breaker Beach component (3930 ± 95 ; Helmer 1991:304), Devon Island; the Mosquito Ridge site (3800 ± 40 ; Milne and Donnelly 2004:96) and LdFa-12 site (3670 ± 40 B.P.), southern Baffin Island; and the NhIf-57 site (3640 ± 40 B.P.), Igloodik. If site dates from Saglek Bay (3830 ± 115 B.P.; Tuck 1975:148) and Nain (3810 ± 75 B.P. [Cox 1978:99]; 3700 ± 140 B.P. [Fitzhugh 1976:107]), Labrador, and eastern Nunavik (3800 ± 70 B.P.; Gendron and Pinard 2000:136) are also considered, the temporal depth for Pre-Dorset is extended further into the past in several regions and is on par with other early ASTt occupations documented in the eastern Arctic.

Lithic evidence from several Pre-Dorset sites on southern Baffin, Igloodik, Somerset, and Devon Islands includes bipointed and contracting stemmed endblades with edge serration; thin triangular endblades with edge serration; large asymmetrical bifaces presumed to function as knives; burins that are unifacially flaked and lack grinding or polish; large flared endscrapers; concave sidescrapers; and the occurrence of deep edge serration on certain tool types (see Bielawski 1988:Figures 4, 5, 8; Helmer 1991:Figure 7; Milne 2003b:Figure 2; 2008:Figure 2; Milne and Donnelly 2004:Figures 14–16; Stenton and Park 2003:Plate 3). Given the widely presumed absence of these artifact types and treatments among Pre-Dorset sites, Tuck (1975:141) even suggested that in instances where they do occur it is more likely these objects were intrusive, having originated in an earlier ASTt occupation of the same area. However, the widespread occurrence of these artifact types and treatments in the above-noted sites and also those from Nunavik and Labrador indicates far greater technological similarities than differences among all early ASTt sites throughout the eastern Arctic.

It is known that burins are not a reliable indicator of early ASTt cultural affiliation, given the pronounced degree of variability they exhibit, which is related more directly to function, length of use-life, and individual skill and preferences (Bielawski 1988:62; McGhee 1980; Maxwell 1985:91–92; Milne 2003a; see also Barton et al. 1996). And, the presence or absence of edge serration on lithic tools, particularly bifaces, likely has more to do with their function as effective killing tools (see Ellis 1997:50–51) than with a culturally specific preference for such an edge treatment. Moreover, to apply these kinds of edge treatments one must have access to high-quality toolstone, such as that found in Labrador but which is notably absent on southern Baffin Island (ten Bruggencate et al. 2015). If one is stuck working with small-sized, inferior-quality toolstone, it directly influences the size, shape, and stylistic elaboration of a tool—an observation made long ago by Maxwell (1973). Consequently, the absence of large burins and edge serration from the early Lake Harbour assemblages used to define Pre-Dorset is a direct reflection

of the inferior quality of toolstone in the area and the fact it precludes elaborate styles and patterns of workmanship that are regularly observed on lithic tools from Labrador and other regions. As such, these are not objective criteria with which to define early ASTt lithic assemblages.

In considering the available evidence that occurs most frequently in early ASTt sites throughout the Arctic, those traits exhibited by Pre-Dorset sites and assemblages are not that distinct from those used to classify Independence I and Labrador Pre-Dorset. These similarities rather than differences warrant closer evaluation and it would appear essential that archaeologists reconsider how Pre-Dorset and other early ASTt manifestations throughout the Arctic are classified.

DISCUSSION AND CONCLUSIONS

Since the 1950s, a large body of research on the Pre-Dorset culture has been generated, resulting in a more detailed understanding of these people's lifeways in many diverse regions throughout the eastern Arctic. However, as this chapter has outlined, there exists considerable variability in the material record for this culture, which increasingly complicates efforts to define it as a single cohesive entity. For decades, archaeologists have questioned the adequacy of the artifact typologies used to interpret and compare Paleoeskimo artifact assemblages throughout the Arctic. Moreover, it seems that the problems relating to organic preservation will persist even as new Pre-Dorset sites are found simply because of historical climatic circumstance and their more southerly Arctic locations. Therefore, stone tool remains are the best candidates on which to focus for future research since they are the common denominator that ties together all Paleoeskimo sites throughout the circumpolar region.

Efforts to conduct more objective analyses that go beyond the limitations of traditional type lists have provided new perspectives on Pre-Dorset lithic technology. For example, detailed artifact and debitage analyses have been used to isolate patterns of variability to infer site seasonality, reduction strategies, mobility patterns, site function, skill acquisition, raw-material procurement and discard patterns, and activity scheduling.

Another avenue of research that has significant interpretive potential for Arctic lithic research focuses on provenance studies, otherwise known as raw-material sourcing. Using the geochemical signatures of distinct toolstones as a proxy, archaeologists have been able to address a wide range of topics including mobility and settlement, interregional trade, and even site seasonality. Little information presently exists on how and where Paleoeskimo toolmakers acquired usable toolstone, despite the fact it is an essential first step to understanding how past populations organized, used, and maintained their lithic technologies. Therefore, conducting raw-material provenance research in the eastern Arctic seems like a logical and objective step forward for future analyses of Pre-Dorset lithic assemblages, in that the information this research would

generate could be used to link site assemblages to source areas and ultimately to one another. In turn, this would provide a new line of evidence with which to examine longstanding cultural-historical issues relating to migration, settlement and mobility, technological innovation, cultural affiliation, interaction and trade, and possibly even change over time.

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CHAPTER 30

INDEPENDENCE I AND SAQQAQ

The First Greenlanders

BJARNE GRØNNOW

A HIGH ARCTIC GATEWAY TO GREENLAND

The North Water Polynya

When the Greenland Ice Cap melted back 8,500 years ago, a varied land- and seascape, including fjords, coastal mountains, and inland plains, appeared. Marine and terrestrial game expanded their range and resource-rich environments developed in Greenland. However, four millennia were to pass before humans reached this part of the Arctic Archipelago, which became the easternmost border of the Arctic societies of North America. The remarkably late timing of the peopling of Greenland was determined by a combination of cultural, societal, demographic, and geographical options and limitations.

Greenland's geographical position restricts human access. By traditional means of transportation, the area can be entered only from the west via High Arctic Canada (Queen Elizabeth Islands) and a crossing of the ice-bound Nares Strait, which separates Ellesmere Island from northwest Greenland—a journey through some of the most extreme environments in the world seen from a human point of view (Grønnow and Sørensen 2006; Meldgaard 1977). Specific cultural and societal strategies and technological inventions and adaptations to cope with life in these areas were developed in the Bering Strait region only 5,500 years ago. In the archaeological record this is marked by the first traces of the Paleoeskimos and the Arctic Small Tool tradition (e.g., Harritt 1998; Slaughter 2005), and the first “Greenlanders” were part of this development.

Radiocarbon dates from Alaska and across High Arctic Canada make it possible to follow the eastward expansions of the pioneering societies in broad outline. It took about half a millennium before the Paleoeskimos reached the central Canadian High Arctic and another 500 years before the “Gateway to Greenland” was reached (e.g., Dyke and Savelle 2009; McGhee 1996). In contrast, the dispersal into all regions of Greenland was fast. The world’s largest island was settled about 4,500 years ago through a single or a short series of migrations by the Paleoeskimos (Grønnow and Sørensen 2006).

The “push and pull” factors involved in the initial Paleoeskimo expansion into Greenland were probably complex, but no doubt the resources of the North Water—a large polynya (open-water area) situated in Smith Sound reaching into Baffin Bay—were attractive. The North Water is by far the largest of the very few and dispersed “oases” for humans in the High Arctic (Pedersen et al. 2010; Stirling 1997). Like other polynyas it attracts concentrations of marine mammals—whales, walrus, seals, and polar bears—and sea birds by the millions, and thus the first Greenlanders began their migrations to the north and south of the island in the midst of a huge larder (Schledermann 1980, 1990:10).

The Pioneers

Baptized by two of the pioneers of Arctic archaeology—Jørgen Meldgaard (1926–2006) and Eigil Knuth (1903–1996)—the earliest Paleoeskimo cultures in Greenland are designated the Saqqaq culture and the Independence I culture (Knuth 1954; Larsen and Meldgaard 1958). Following the geographer Hans Peder Steensby (1916), Knuth invested a lifelong effort in surveying and excavating Independence I sites along Steensby’s “Musk Ox Way” from Nares Strait to northeast Greenland (Grønnow and Jensen 2003). Meldgaard, on the other hand, identified Saqqaq sites along the “Caribou Way” leading southward from the Thule region, across Melville Bay into West Greenland.

The defining Independence I lithic toolkit is characterized by large bifacial knives, adzes, tanged projectile points, broad microblades, and unground burins. Sites are distributed across the High Arctic ecozone, from the islands of the eastern Canadian High Arctic via the Nares Strait region and Peary Land to northeast Greenland. Concentrations of sites have been documented in several regions, including the Bache Peninsula region of Ellesmere Island (Schledermann 1990), along Wandel Dal–Jørgen Brønlund Fjord in Peary Land (Grønnow and Jensen 2003:56–189; Knuth 1983), and in northeast Greenland (Andreasen 1996; Sandell and Sandell 1996; Tuborg and Sandell 1999). As we shall see, the Independence I groups thrived for probably a few centuries (maximum 2500–1800 cal B.C.) in their “remote” and extreme High Arctic environment.

The Saqqaq lithic production sequence was aimed at making bifacial knives, projectile points, adzes, scrapers, and ground burins. It differs from Independence I lithic production, probably as a consequence of the Saqqaq pioneers’ discovery and subsequent extensive utilization of a gray metamorphosed slate, known as “killiaq,” which is found at only a few outcrops in West Greenland (Sørensen 2012:54–59). The density of Saqqaq

sites is high in the rich and varied environments of low Arctic West Greenland (e.g., Hinnerson-Berglund 2004; Gotfredsen and Møbjerg 2004; Jensen 2006) and in some regions of East Greenland (Møbjerg 1988). In addition, Saqqaq sites have been traced in the High Arctic, in particular along the coasts of southern Nares Strait (Schledermann 1990:56–90) and northeast Greenland, south of the Sabine Ø region (Bennike et al. 2008; Sørensen et al. 2009). Saqqaq is the longest-lasting culture in Greenland, spanning about two millennia (2500–800/500 cal B.C.)

AT CLOSE QUARTERS WITH THE SAQQAQ PEOPLE

Saqqaq: The Sunny Side

Named after a small hamlet on the sunny side of the Nuussuaq Peninsula in Disko Bugt, Saqqaq, this archaeological culture's lithic inventory was first described by Jørgen Meldgaard (1952). Larsen's and Meldgaard's investigations during the early 1950s at the stratified Sermermiut site in central Disko Bugt finally defined the temporal position of the Saqqaq culture as the first culture in West Greenland (Larsen and Meldgaard 1958). However, as early as the 1830s, stone tools from this area had reached learned circles in Copenhagen (Meldgaard 1996), and already in 1907, Ole Solberg had described a "Greenlandic Stone Age" in his dissertation.

Much attention has been devoted to exploring the Saqqaq culture during the last three decades. Scores of sites are known from low Arctic Greenland and, not the least due to excavations at the two unique permafrozen sites in Disko Bugt, Qajaa and Qeqertasussuk, our insight into Saqqaq material culture is quite unique (Grønnow 1994; Meldgaard 2004).

Raw Materials and Tool Kits

The "hallmark" of the Saqqaq culture, killiaq, was "mined" almost exclusively at a single site on Slibestensfjeldet Mountain, situated on the steep northern coast of the Nuussuaq peninsula in northern West Greenland (Jensen and Petersen 1998; Sørensen 2012:56). The Saqqaq knappers utilized rocks eroded out of a vertical cliff containing the primary thin layer of killiaq. They tested, sorted, and worked the nodules into standardized cores at knapping sites in the scree. Subsequently the cores were transported downhill to sites like Qaarsut at the beach, from where the blanks were taken, after further trimming, to sites in the Nuussuaq region and exported to the entire west coast. These were the first steps in a lithic *chaîne opératoire* (production sequence), in which different knapping processes carried out at the dwelling sites led to the production of bifaces

for standardized toolkits (Sørensen 2012:132–134). Other lithic sources were exploited as well, including microcrystalline agates from the Disko Bugt area and more widespread raw materials like fine grained quartzite and quartz crystal (Figure 30.1).

Excellently preserved finds from the permafrozen sites in Disko Bugt have opened up entirely new insights into the production and use of hunting gear and household utensils of bone, antler, ivory, baleen, and wood. It is striking how Saqqaq's utilization of driftwood was technologically advanced and reflected an almost unlimited access to tree trunks of mainly Siberian origin, which had accumulated on raised beaches in West Greenland before the Saqqaq reached the area (Grønnow 1996a). The finds of organic artifacts form a firm starting point for reconstructions of complete tool kits (Grønnow 1994:213, 225; 1996b).

Hunting, Subsistence, and Settlement Patterns

Well-preserved Saqqaq sites in West Greenland show that practically all kinds of food resources were utilized. Bones from 16 species of sea and land mammals, 18 different bird species, and six species of fish were recovered from the frozen midden layers at Qeqertasussuk. Remains of mussels, seaweed, and lots of berries were recovered as well, documenting the great breadth of the subsistence strategy (Böcher and Fredskild 1993; Meldgaard 2004).

A wide range of specialized and light hunting tools from Qeqertasussuk and Qajaa reflects this broad resource utilization. Harpoons used for hunting ringed seal and harp seals were light and were armed with small toggling harpoon heads (Type Qt A) or tanged harpoon heads (Type Qt B, C and D) (Grønnow 1997). Fragments of paddles and frames indicate that seals and other marine game species were hunted from kayak-like vessels (Grønnow 1994:221–222). Hunting of harp seal in particular took place during the seals' spring migration, during which they pass the coasts in large herds. The light harpoons for open-water hunting were launched by means of atlatls made from whale bone. Analyses of the age profile of the harp seals at Qeqertasussuk indicate that entire herds of these marine mammals were targets for large-scale hunting. Sealing nets of baleen were probably used in this context (Meldgaard 2004:165). Hunting of large seals like bladdernose and bearded seal is documented in the faunal remains, and ringed seals, which were an indispensable resource, were taken during winter through breathing holes or during spring on the ice. There are no archaeological traces of the use of inflated bladders in connection with Saqqaq sealing. Walrus hunting and hunting of polar bear—probably by means of heavy lances—are documented at the Nipisat site in the Sisimiut area (Gotfredsen and Møbjerg 2004). Bones, teeth and baleen from six whale species were found on the Qeqertasussuk site, including bowhead, sperm whale, killer whale, porpoise, narwhal, and minke whale (Meldgaard 2004:125–132). Heavy lances may indicate hunting of this big game, but natural carcasses of the large whales were probably “mined” for meat and raw materials as well.

A

Raw material

Preforms

Tools

Rejuvenations

Discard

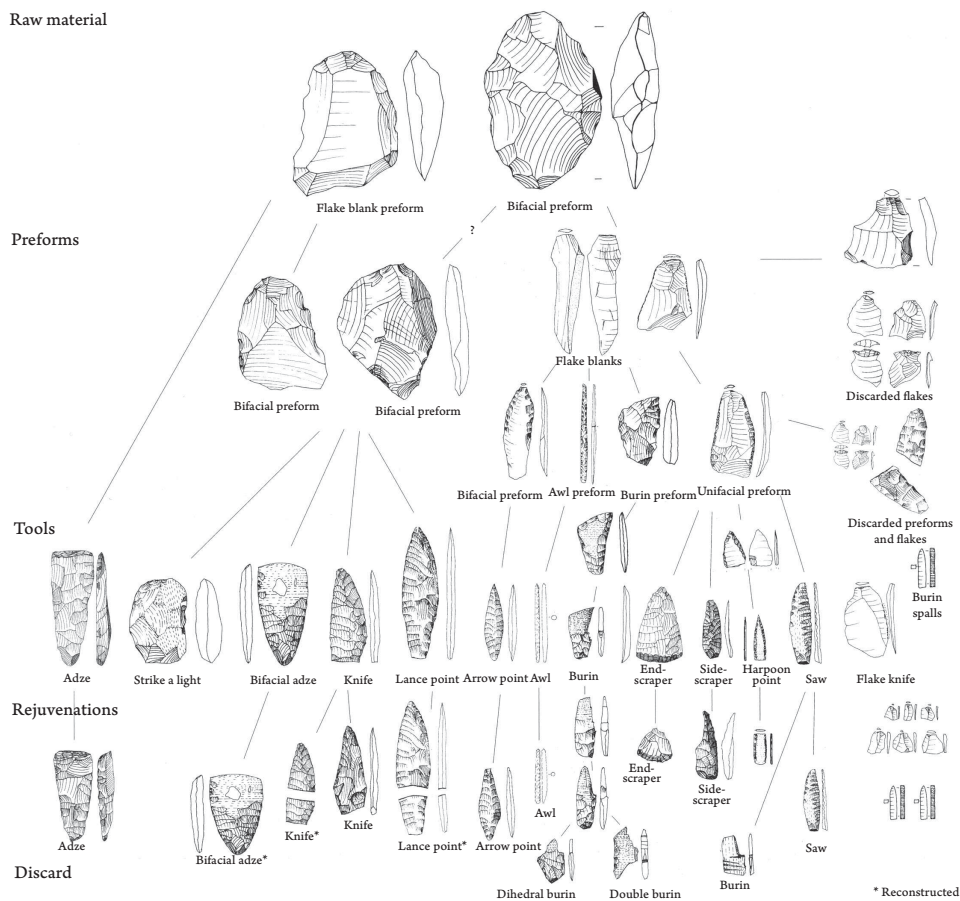


FIGURE 30.1A AND 30.1B From blanks to tools and refuse: the working process of the Saqqaq culture. (a) diagram (Sørensen 2012:134); (b) a complete tool: bifacial knife blade in original wooden haft with baleen lashing from Qeqertasussuk (Gulløv 2004:85).

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Birds were hunted by means of slender bird spears armed with three end prongs, as shown by finds from Qeqertasussuk and Qajaa of wooden foreshafts with three longitudinal grooves and long barbed prongs of whale bone (Grønnow 1994:223). Species from bird cliffs like Brünnich's and black guillemot and little auk were important, but many species of ducks, eiders, fulmar, and gulls were caught (Gotfredsen and Møbjerg 2004:102-141; Meldgaard 2004:132-145). Of particular interest is the great auk—the large, now-extinct “penguin of the north.” Saqqaq hunters caught this bird species 500–1,000 km north of its distribution during historical times. This is one of several indications of a relatively warm climate during the Saqqaq period. Some of the barbed prongs were probably parts of fishing spears with which char and probably large cod were caught (Grønnow 1994:216–217; Meldgaard 2004:132–144).

Bows and arrows for hunting of terrestrial game were an integral part of the first Greenlanders' toolkit. Fragments of bows and long arrows with foreshafts and tanged killiaq points have been found at Qajaa and Qeqertasussuk (Grønnow 1994:217, 224). The bows were sinew-backed and made from driftwood. The workmanship was precise, as with all Saqqaq technology. Bows and arrows and probably light throwing spears, as well, were used for caribou hunting (Grønnow 1994:224). Dogs assisted the hunters on their inland trips (Meldgaard 2004:87–90). Caribou were extensively hunted in inland regions, which, due to accelerated melting of the Ice Cap, were considerably larger than at present. The meat was transported to sites in the coastal zone, such as Nipisat (Gotfredsen and Møbjerg 2004). Specialized caribou hunting sites are found in the inner fjords of west Greenland, such as Angujaartorfik in Kangerlussuaq Fjord and Itinnera in Nuuk Fjord (Appelt and Pind 1996; Kapel 1996; Møhl 1972).

Some baleen lines from the permafrozen sites have nooses indicating that ptarmigans and hares, which are represented in the fauna material, were caught by means of snares (Grønnow 1996b:28). Arctic foxes were hunted not only for their fur; cut marks on the bones indicate that foxes were eaten (Meldgaard 2004:147–150).

As everywhere in the Arctic, Saqqaq had to cope with marked seasonal shifts and variable regional distribution of the resources. This is reflected in the settlement patterns in two main ways. First, there are indications at Qeqertasussuk of a shift from a “pioneer settlement pattern,” where the site was a year-round base camp from which all resources in the vicinity were utilized, to a more complex system, in which Qeqertasussuk became a spring or summer site in a chain of more specialized seasonal sites (Meldgaard 2004). Second, the settlement patterns vary throughout the large Saqqaq cultural area, depending on local conditions. For example, the settlement pattern in Disko Bugt seems to be centered on three unusually large sites—Sermermiut, Qajaa (Figure 30.2), and Saqqaq—situated at the mouths of the ice fjords, where resources were plentiful all year round. The extent of settlement areas and the voluminous middens at these sites indicate that they were likely inhabited by dozens of families at the same time. Apart from serving as year-round base camps, they probably served as aggregation sites for most of the Saqqaq population in Disko Bugt. Likely, once a year, families would leave their base camps in the outer parts of the bay in order to gather at Sermermiut, Qajaa, or Saqqaq. Numerous specialized camps with only one



FIGURE 30.2 The permafrozen Saqqaq site, Qajaa, situated at the Ilulissat Isfjord. View from south.

Photograph: Bjarne Grønnow, 2009

or a few dwellings, either situated close to the edge of the fast ice or in the inner bays, were connected to the base camps via a seasonal round, which included fishing, fowling and caribou hunting (Jensen 2006; Meldgaard 2004).

A second example of Saqqaq settlement patterns is seen in the Sisimiut and Nuuk areas, in Low Arctic West Greenland. Here, Saqqaq subsistence was heavily influenced by the presence of year-round ice-free sea, deep fjords, and extensive inland areas (Gotfredsen and Møbjerg 2004). Small seal and bird hunting sites, including one or two tent rings, are situated in the archipelagos off the mouth of Nuuk Fjord. Saqqaq base camps were established on points and islands inside the fjord complex. From these camps the fjord's plentiful resources of seal, fish, bird, and occasionally big whale were exploited. Marianes Pynt was such a substantial base camp and a center of the Saqqaq social, ideological, and economic world in Nuuk Fjord (Hinnerson-Berglund 2004). Char fishing and caribou hunting were conducted from sites at the inner parts and heads of the fjord (e.g., the sites of Nunnguaq and Itinnera). Tuapassuit, with its over 100 open-air fireplaces, probably reflects gatherings of the "fjord-dwellers," who met in the mid-fjord area during summer or fall travels (Appelt 2006).

Substantial studies of Saqqaq settlement patterns in High Arctic regions are lacking. However, judging from the high frequency of sites at the North Water, the mouth of Scoresby Sund, and at the Sirius Water 500 km further north, it appears that Saqqaq life

depended on resource concentrations in the recurring polynyas (Schledermann 1990 Sørensen et al. 2009; Tuborg and Sandell 1999).

In conclusion, Saqqaq subsistence was based on the ability to utilize practically every living resource. The early Paleoeskimo people, who became the bearers of the archaeologically defined Saqqaq culture, possessed a complete set of diverse and “high-tech” lightweight hunting gear and sea-going vessels—equipment which suited an extremely mobile life style and with which they could cope with a remarkably broad spectrum of Arctic resources (Figure 30.3). As we shall see, this technology did not change much throughout the entire Saqqaq era.

Life at Dwelling Sites

Excavations and surveys have revealed a large number of Saqqaq dwellings. They are almost all traces of tents with circular or oval ground plan. Some consist of double rings of rocks, indicating the use of doubled walled skin tents, but most tent rings consist of a single periphery—typically 3–6 m in diameter—of head-sized stones, which supported tent poles and anchored skin covers. Some tents seem to have been surrounded by a low turf wall for protection, like “tent-houses” (Appelt and Pind 1996:132; Jensen 2006:172; Olsen 1998:87–90).

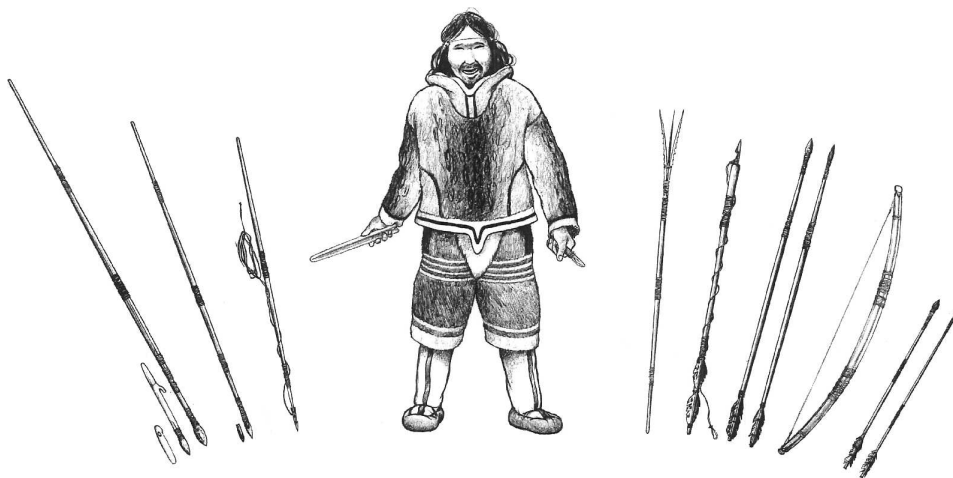


FIGURE 30.3 A tentative reconstruction of the hunting toolkit of the Saqqaq hunter, based on finds from the permafrozen sites Qajaa and Qeqertasussuk in Disko Bugt, and Nipisat in the Sisimiut region, west Greenland. From left to right: heavy lance with three different foreshafts and endblades, a light lance with two kinds of foreshaft, a harpoon with toggling harpoon head, a Saqqaq hunter with an atlatl and a knife, a three-pronged bird dart, a light throwing harpoon, two light darts, a bow, and two arrows with a broad and a slender arrowhead, respectively (illustration by Nuka Godtfredsen). Finds of fragments of oars and ribs from slender vessels from the Disko Bugt sites indicate that the Saqqaq hunter also had kayak-like vessels at his disposal (Grønnow 1994:221–222).

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Many Saqqaq tent rings show a central, round fireplace, a rectangular box hearth or a so-called mid-passage consisting of a rectangular frame of flag stones with separate chambers separating the floor plan in two halves (Gulløv 2004:91–95). The hearths are often filled with fire-cracked rocks. Saqqaq dwellings with solid internal structures and heaps of fire-cracked rocks are interpreted as cold-season dwellings, which were heated by convection; large quantities of fist-sized rocks were heated outside the dwellings in fireplaces fuelled by driftwood and blubber. The hot rocks were put in wooden trays, carried inside and placed in the box hearth or central chamber of the mid-passage, where the rocks produced nice, smoke-free heating for hours (Odgaard 2003). During the early centuries of the Saqqaq period, dwellings were lit by blubber lamps roughly made from soapstone or sandstone (Hinnerson-Berglund 2003:334, 340). Later, more formal types—small circular blubber lamps of sandstone or soapstone—became common (Grønnow et al. 2014).

Excavations at the permanently frozen sites Qeqertasussuk and Qajaa document that the sleeping area on one side of the mid-passage was covered with heather. The opposite side was a working area. Around the mid-passage there was a small floor area, and a kind of work table constructed from flagstones was placed in the front part of the passage (Grønnow 1994:204). Some dwellings were provided with a flagstone platform on one side of a central fireplace (Olsen 1998:88). At Qeqertasussuk, a number of slender vertical poles with pointed ends were located at the back of one of the mid-passages indicating that supports and drying racks were situated close to the source of heat (Odgaard 2003:365).

Now and then the Saqqaq people cleaned their dwellings; heather, wood shavings, bones, exhausted “boiling stones,” and other refuse ended up in the midden areas. However, waste still accumulated inside the dwellings. At Qajaa and Qeqertasussuk, excavated floor layers consisted of wooden shavings and split pieces from the shaping of shafts, bowls, poles, and so on, combined with shreds of baleen, whale bone, and antler shavings, and heather mixed with a small component of debris from resharpening of lithic tools. Analyses of this soft “flooring” show that it was the home of all sorts of insects and other microfauna, including lice, reflecting a warm indoor climate (Böcher and Fredskild 1993).

Hafted and complete tools, rough-outs, broken pieces, and other organic waste recovered at the permafrozen sites provide an interesting picture of the daily activities at a Saqqaq dwelling site. A few of the more noteworthy examples follow (based on Grønnow 1994:205–210; 1996b). Tiny bird-bone needles, needle cases, twined threads of sinew and hafted microblades (“sewing knives”), as well as fragments of skin garments with preserved seams, document the production of complex tailored clothing. Knives of different sizes and shapes were primarily used for cutting meat and blubber. Meat was boiled by means of hot stones in water-filled skin bags or fried on heated flagstones, and wooden trays and bowls were used in food preparation and serving. Meat forks and spoons of wood, antler, and ivory were part of the “food kit,” as well. The Saqqaq “carpenter” was expert in utilizing driftwood logs—primarily spruce and larch—and local juniper (Grønnow 1996a). Driftwood logs were split by means of wedges of antler and whale bone. Selected pieces were worked into parts of poles, shafts, hafts, bowls, and so

on, by means of killiaq adzes, which were used during the entire production sequence except for the finishing stage, which used grooved pumice grinding stones (Grønnow 1996a:85). Long, undamaged pieces of driftwood were rare, and thus the Saqqaq craftsman was a master of lashing. By means of thin strings of baleen, several precisely made components were lashed together to form complete tools like harpoon and spear shafts, bows, kayak frames, tent poles, and so on (Grønnow 1996a:87).

Beyond Material Culture

According to the size and structure of the dwellings, we assume that nuclear families formed the basic social unit in Saqqaq society. Some dwellings are, however, large enough to house a couple of families or extended families (e.g., Qeqertasussuk, Dwelling A8, with a ground plan of 7×4 m [Grønnow 1994:204]), but most seem to have been single-family dwellings. Base camps and assembly camps consisted of separate family dwellings, and hitherto no communal dwelling structures have been assigned to the Saqqaq culture.

In order to trace divisions of work spaces inside dwellings, analyses of the distribution of artifacts and debris on the dwelling floors have been conducted at a few sites, for example at the cold-season sites Tupersuai and Nivertusannguaq in Disko Bugt (Olsen 1998). Scrapers, retouched flakes, and microblades tend to concentrate on one half of the floors, whereas projectile points cluster in the opposite halves. This is interpreted as an indication of spatial differentiation of gender specific tasks in Saqqaq society, which is in accordance with ethnographic analogies.

There are no indications of social hierarchy. However, it must be stressed that a main source which archaeology traditionally draws upon when “reading” social structure from material culture is missing: the graves. None of the structures investigated hitherto are graves, and the few human bones dating to the Saqqaq era were recovered in the midden layers at Qeqertasussuk (Grønnow 1994:219–220; Koch et al. 1996). Judging from the dwellings described above, an egalitarian social structure existed. No dwelling seems to differ significantly from others in respect to socially relevant material culture such as frequencies of exotic raw materials or artifacts holding great material or symbolic value.

The wide distribution of killiaq and the very specific and standardized design of artifacts and layout of dwellings over the entire far-flung Saqqaq area indicate formalized contacts over great distances. Food resources and raw materials are unevenly distributed in Greenland, and we assume that this of necessity led to the formation of exchange networks between regional groups. In the archaeological record, regional utilization patterns of lithic raw materials like killiaq, microcrystalline quartz, quartzite, chert, and basalt are seen. Killiaq became increasingly dominant over other sorts of lithic raw materials through time in Disko Bugt: from about 70 percent in the pioneer phase to 95 percent in the later phases (Grønnow 1994:225–226), whereas the share of “killiaq” followed the opposite trend in the Sisimiut region, 300 kilometers further south: from

80–100 percent in the early Saqqaq to 25–70 percent in the late phases (Kramer 1996). Thus, access to the important “killiaq” outcrop on Nuussuaq probably became increasingly restricted and controlled by the Disko Bugt regional group through time (Jensen 2006:85–96).

Aspects of the cosmology and spiritual world of the Saqqaq people are embedded in their material culture, but it is difficult to read this information. Interpretations revolve around the symbolic meaning of the floor plan, which, as mentioned above, in some cases was divided in two halves by the mid-passage. Researchers applying a structuralist approach put weight on indications of oppositions, for example a male and female side in the mid-passage dwelling (McGhee 1979:52–55; Olsen 1998:118–121). Other researchers with a starting point in phenomenology assign a shamanistic world view to the Saqqaq, arguing that the mid-passages symbolized “clan rivers,” which the shaman used for his or her journeys between the under, middle, and upper worlds (Odgaard 2003:369). Based on ethnographic analogy, it has been suggested that the characteristic ivory and antler harpoon heads possessed their own spirit, *inua*, which was important in “negotiations” between hunter and prey (Grønnow 1997:128; 2012).

Apparently, Saqqaq people produced no figurines, whether naturalistic or abstract, and only a handful of decorated objects have been recovered among thousands of artifacts; these include needle cases (bone tubes) and cases from antler or narwhal ivory probably for keeping spare harpoon points. These objects are decorated with simple lines (Grønnow 1994:232). Recent analyses of wooden artifacts from Qajaa and Qeqertasussuk have revealed fragments of round wooden frames, which in every respect resemble frames of historic Inuit drums used in connection with song contests and shamanistic sessions. No direct evidence of “specialized shamans” has been documented concerning the Saqqaq culture, but the character of the decorations and the presence of drums indicate that animism was an integral part of the “Arctic package” with which the first people entered the eastern Arctic (Grønnow 2012).

Saqqaq Genetic Relationships

Even if no formal graves are known from the Saqqaq period, a few human remains have been found. A tooth (molar) was recovered at the caribou hunting site Itinnera in Nuuk Fjord, and four long bones and five tufts of human hair were preserved in the permafrozen midden layers at Qeqertasussuk. The bones are dated to the earliest phase at the site (about 2400 cal B.C.), whereas the hair were found in layers dating a little later (about 2200–2000 cal B.C.). The four bones (two fibulas, a tibia, and a humerus) come from two individuals: the leg bones probably represent a single individual, an adult female (20–40 years of age), and the humerus probably belonged to a man (40–60 years of age) (Koch et al. 1996). Hitherto, it has not been possible to extract ancient DNA from these bones, but the tufts of hair were more informative in this respect. Due to the structure of hair cells, uncontaminated ancient DNA was recovered from the largest tuft. This allowed not only a determination of the

mitochondrial DNA (representing the mother's lineage) but also reconstruction of the entire human genome (Gilbert et al. 2008; Rasmussen et al. 2010). Analyses show that the "owner" of the hair was a Saqqaq man, whose closest modern descendants are eastern Siberian Yuit or Aleuts. The 4,000-year-old complete genome of this man from Qeqertasussuk is close to that of modern Koryaks and Chukchis of Siberia. Thus, the ancient DNA analyses support the hypothesis based on archaeological evidence that the Paleoeskimos originated about 5,500 years ago in eastern Siberia, and that there are no direct or simple genetic links between the early Paleoeskimos and the later Thule culture or historic Inuit.

LIFE AT THE EDGE: INDEPENDENCE I

The Independence World

Even at an Arctic scale, the Independence I people were living in an extraordinarily remote and harsh environment and in relative isolation in their High Arctic world. Nevertheless, these small hunting groups thrived for several generations in the northernmost tracts on the Earth, which are characterized by barren deserts, permanent sea-ice cover, several months of extremely low temperatures, and winter darkness. The Independence way of life has no direct historic or ethnographic analogy, and we are left with interpretations of a number of quite "modest" archaeological traces like tent rings and a few caches—"the northernmost ruins of the Globe" as they were designated by Eigil Knuth. He pictured human life in Peary Land as divided into a light summer season, with intensive muskox hunting and char fishing, and a dark winter season based on stored meat and fat and spent in a state of "hibernation" in the mid-passage dwellings (Knuth 1958, 1967, 1983).

Settlements, Subsistence, and Mobility

A number of Independence I sites are located along ice-covered inner fjords or lakes and streams. On Ellesmere Island, such "inland sites" are found along the banks of Lake Hazen (Sutherland 1996) and in central Peary Land there is evidence of a coherent settlement system connecting the interior and an inner fjord area (Knuth 1967:210).

Consisting of 15–20 dwelling features and a number of caches, the largest site in Peary Land is Pearylandville (Grønnow and Jensen 2003:85–107). Recent analyses render probable that most of these dwellings were used at the same time (Jensen 2009). The site is situated on a gravel terrace next to the lake, Midsommersø. A number of small camps are found close by, and some of them are situated in the river valley east of the lake leading to the head of Jørgen Brønlund Fjord. Here, at a distance of 30 kilometers from Pearylandville, another large site, Deltaterrasserne, consisting of 20 dwellings,

is situated. Further east, where Jørgen Brønlund Fjord meets the large Independence Fjord, several small Independence I sites are situated on former gravel beaches (Grønnow and Jensen 2003).

Pearylandville and Deltaterrasserne are interpreted as aggregation camps used within the same settlement system but with a different seasonality. Analyses of faunal remains from these camps show that muskox was by far the most important resource at both camps, but also an opportunistic hunting of arctic hare, fox, and birds (primarily ptarmigan and brent or barnacle goose) took place, as well as intensive Arctic char fishing (Darwent 2003). Deltaterrasserne, with its relatively large amount of bird bones, seems to have been the preferred summer aggregation camp in this system, whereas Pearylandville could have been a major winter settlement, where cached meat was an important food resource. Most of the year, however, the hunting was more evenly distributed in the landscape, and game like ringed seal supplemented the terrestrial diet at smaller camps along the openings in the fjords (Darwent 2003). The settlements in Peary Land were an integral part of a larger network. Analyses of lithic raw materials used at Pearylandville show that blanks and tools of a black or green chert from outcrops close to the Adam C. Knuth site—more than 100 kilometers to the north—and light-blue chert from outcrops over 200 kilometers to the southeast (around the head of Danmark Fjord) were transported to the site (Grønnow and Jensen 2003; Sørensen 2012:139–179).

Our picture of Independence I is to a large degree colored by the finds in Peary Land, however Independence I sites in most other High Arctic regions are situated at the coast close to areas with frequent breakup of sea ice or at polynyas. Thus sites are located in the North Devon Lowlands (Helmer 1991), at Penny's North Water (e.g., sites at Port Refuge [McGhee 1979]), at the North Water (e.g., Lakeview site, Tusk site [Schledermann 1990]), at the North East Water (Eigil Knuth site, a number of sites in Dove Bugt [Andreassen 1996]), at the Sirius Water in northeast Greenland (e.g., Walrus Island (Sørensen 2009)), and at the Scoresbysund polynya (Tuborg and Sandell 1999). The preserved faunal materials from these sites are admittedly sparse; however, like the topographical situation of these sites, the bones reflect an important marine aspect of Independence I subsistence. Ringed seal was the most important resource at these sites, but bearded seal, walrus, polar bear, and a number of sea birds supplemented the diet (McGhee 1979:35–38). Based on analyses of the topographical situation of sites in relation to sea ice and accessible inland areas, a model for a seasonal settlement cycle has been suggested for the Scoresbysund area. This includes presumed winter sites oriented toward the resources of the polynya (e.g., Kap Tobin), substantial spring or summer sites near ice edges (e.g., Store Sten), where migrating mammals like narwhal and walrus concentrated, and small, single-family sites aimed either at land-mammal hunting (fjord sites like Røde Hytte) or at seal-hunting in the fjord complex (e.g., Hekla Havn) (Tuborg and Sandell 1999:137–139).

It is a fact that Independence I dwellings are concentrated at the polynyas, but the magnitude of the sites is far from the “megasites” of the Dorset or the Thule culture at the Sirius Water, North Water, or other High Arctic open-water areas (Grønnow et al.

2011). Moreover, Independence I caches at these sites are quite few, and refuse materials and artifacts in the dwellings are generally sparse. Thus, we conclude that Independence I subsistence economy was closer to a forager than to a collector strategy (Binford 1980). This is in contrast to Neoeskimo subsistence strategies in the same regions, 3,500 years later.

Independence I Dwellings

About one-third of the Independence dwellings include a mid-passage—the archaeological “trademark” of the culture. In fact, these rounded or oval tent rings with their passages of raised flagstones are markers in the High Arctic “cultural landscape” (e.g., Knuth 1967; Schledermann 1996; Sutherland 2003) (Figure 30.4).

Often the central chamber of the mid-passage contain a hearth consisting of a heap of burnt bones, fire-cracked stones, small flagstones, and a bottom layer of blubber-saturated sand or gravel. Recent experimental archaeological analyses render it probable that these carefully built central hearths functioned as sources of light as well as heat; in other words, they served as veritable blubber lamps (Odgaard 2003).

Most Independence I dwelling remains consist of a tent ring, which includes either no internal stone-built structures, a single box hearth, or a central concentration of fire-cracked rocks. At some sites, traces of dwellings are reduced to clearings in boulder fields or trampled oval areas on gravel terraces (Sørensen et al. 2009:55–56). Analyses of fauna, topography, and artifact concentrations and frequencies have not yet yielded an unambiguous correlation between seasonality and dwelling type. However, in Peary Land the few features, which include a central hearth and are notably rich in finds (large quantities of lithic refuse and discarded or resharpened artifacts), are all situated on large sites with meat caches. Thus, these kinds of dwellings are interpreted as winter tents (Grønnow and Jensen 2003:336).

In some dwellings, broken needles and microblades are concentrated on one side of the mid-passage, whereas the floor on the opposite side contains mainly burins and projectile points. This probably reflects a gender-specific division of the floor, which resembles the Saqqaq situation described above (Knuth 1967:200; McGhee 1979:53). The find distribution in a tent with a central hearth on the Adam C. Knuth site suggests a division between a sleeping area in the back half and a floor or working space in the front half. A fan-shaped distribution of flakes, broken tools, and exhausted fire-cracked rocks shows how waste was partly thrown out of the door and partly dumped in heaps in front of the tent (Grønnow and Jensen 2003:232).

Independence I Material Culture

Only a few Independence I sites show preservation of organic matter. However, sewing needles of bird bones with tiny round eyes have frequently “survived.” They testify

A

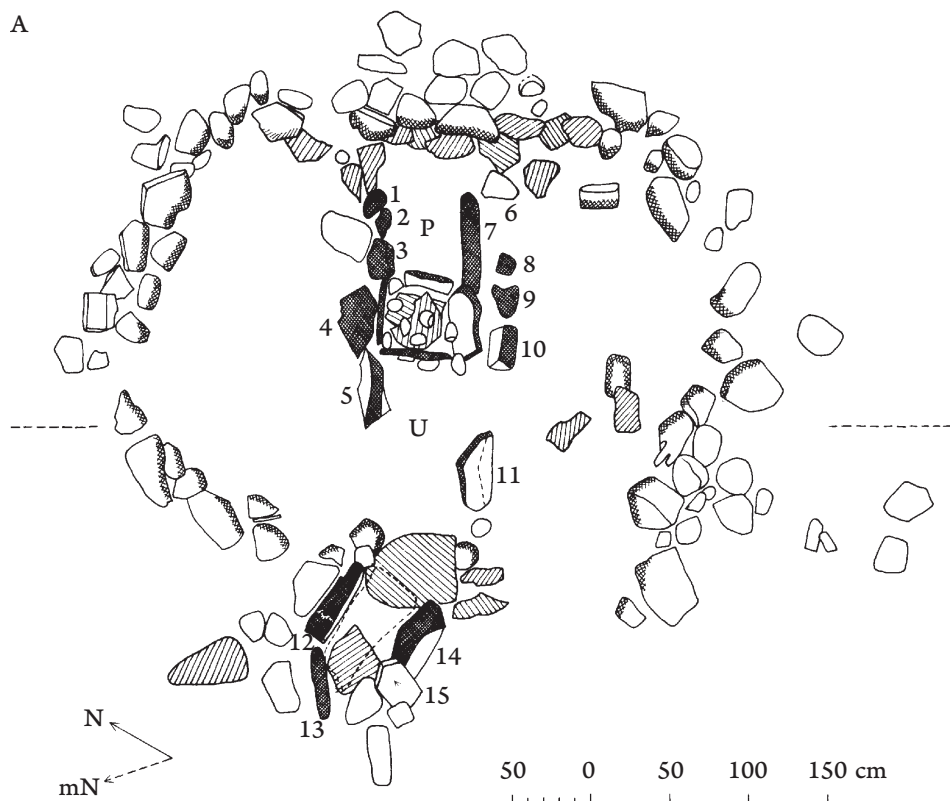


FIGURE 30.4 (a) Plan of Independence I mid-passage dwelling; (b) photograph, showing the mid-passage box fireplace with fire-cracked rocks. Both from ruin no. 3 at Gammel Strand Nord, Peary Land (Grønnow and Jensen 2003:179–180; Knuth 1967:212).

National Museum of Denmark, Copenhagen

that making and maintenance of skin garments was a most important craft. Small flint flakers of bone or ivory, which originally were hafted, and harpoon heads belonged to the hunter's toolkit (Grønnow and Jensen 2003:108; McGhee 1979:151; Schledermann 1990:54). A few tanged and toggling harpoon heads have been recovered from the Cold component site on Devon Island in Canada, whereas none have been found on Greenlandic sites. The harpoon heads are similar to those described from the Saqqaq culture (McGhee 1979:143).

The lithic tool production of the Independence I was quite distinct (Sørensen 2012:139–179). Chert and “flint-like” raw materials, which were gathered as nodules, were preferred, for example, black basalt, silicified slate, agate, and black, blue and gray chert. Compared to other Arctic Small Tool tradition sites, most Independence I tools are “heavy,” as exemplified by broad microblades (Owen 1988:120, 377). End- and side-scrapers and large bifacial knife blades were part of the Independence I toolkit, as were burins. Denticulation along the side edges and notches in the proximal ends are more frequently seen in Independence I than in Saqqaq lithic tool assemblages. The burins are a “cultural marker”: they are large, spalled, and unground, often with coarse notches for lashing the basal end of the burin to the shaft. Thus, characteristic burin spalls often betray the cultural affiliation of a site (Schledermann 1990:344–345). Coarsely made adze heads with ground cutting edges of basalt are Independence I markers, as well. Projectile points include a variety of tanged or tapering bifacial lance heads and precisely made arrow points, and a few tiny triangular, but not ground, harpoon end blades, which originally were wedged into a slot in the distal end of tanged harpoon heads. Examples of typical Independence I artifacts and lithic refuse are found in Helmer (1991:306), Knuth (1958:57), McGhee (1979:136–149), Schledermann (1990:53–55), Sørensen (2010:58–96; 2012:139–179), and Sutherland (1996:274–280).

THE ERA OF THE PIONEERS IN GREENLAND: CULTURAL HISTORICAL PERSPECTIVES

Chronology

Apart from geographical variation in the material culture grown out of variable access to particular types of raw materials, as we have seen with the Saqqaq's use of killiaq in West Greenland, one would expect chronological variation during the long time span of the pioneers in Greenland. This is not the case.

The Independence I toolkit seems completely static through time with regard to raw material preferences, technology and design. Based on the relatively limited number of radiocarbon dates and typological studies of tools and dwellings, it is at present not possible to trace any chronological changes within the Independence I culture.

The potential for chronological studies of the Saqqaq Culture is higher. In West Greenland we are dealing with sites containing stratified culture layers dated by series of radiocarbon dates, and sometimes the sites show excellent preservation, as we have seen above. However, only few and gradual changes in raw-material preferences and style can be traced in the archaeological record throughout almost two millennia.

In Disko Bugt, the preference for killiaq increased throughout the Saqqaq era, as described above. Moreover, during the early centuries of the Saqqaq, agate was preferred for microblade production, but gradually this material was replaced by quartz crystal (Grønnow 1994:224–227). The opposite tendency is documented for the Sisimiut region (Kramer 1996).

One of the very few metric trends of chronological importance concerns the width of the burin base. Throughout 1,000 years at Qeqertasussuk this measurement gradually changed from an average of about 14 mm to an average of about 11 mm (Grønnow 1994:227–230).

So-called beveled projectile points and knives (completely polished on both sides) seem to be a late invention in the Saqqaq culture. At the Nipisat site these points are introduced in the latest phase (3), spanning about 1400–800/500 cal B.C., along with circular lamps and larger vessels of steatite. The characteristic arrow points with tapering stems are not found in assemblages from this terminal phase of the Saqqaq—an indication of the disappearance of the bow and arrow (Gotfredsen and Møbjerg 2004:197–198).

The Saqqaq harpoon heads of antler, whale bone and ivory at Qeqertasussuk can be divided into four types, Qt A–D. The first three types, including all toggling heads and two different types of tanged heads, were used throughout all phases. Type Qt D, with its characteristic position of the line hole above a lateral barb, was introduced about 2000 cal B.C., that is about 400 years after the initial settlement at the site (Grønnow 1997). At the other extreme of the Saqqaq time span, the finds at Nipisat indicate that lance heads of antler was introduced in the latest phase (Gotfredsen and Møbjerg 2004:74–75).

Demography

Following the first Greenlanders' discovery of the "gateway" to Greenland, the groups dispersed to all regions of the country within a remarkably short time span. They possessed a social and material culture that facilitated migration and life in all ecological zones, from the High Arctic deserts of Peary Land to the almost temperate open-water areas in south Greenland. However, as we have seen, the High Arctic was abandoned by the Independence I after a few centuries. Taking the standard deviation of radiocarbon dates into consideration, areas like Peary Land might have been settled for only a couple of generations before the groups "withdrew" to other High Arctic areas—probably to more diverse environments in northeast Greenland and the Thule area. Even there we lose track of the Independence I people after some centuries. Subsequently, High Arctic Greenland was abandoned or—with regard to the Thule area—settled only sporadically

by Saqqaq and Pre-Dorset (Grønnow and Jensen 2003:331; Grønnow and Sørensen 2006:68; Schledermann 1990; Sørensen 2010; Sutherland 1996).

In contrast, the Saqqaq “territory” experienced the hitherto longest continuous period of settlement in Greenland. But even in this case the typical demographic pattern consisting of regional expansions and contractions is seen. The duration of Saqqaq presence in High Arctic Greenland—“marginal areas” for this culture—is yet unknown due to lack of coherent series of radiocarbon dates, but in West Greenland there is convincing evidence for a regional contraction during the latest part of the Saqqaq culture. By 900/800 cal B.C., Disko Bugt is deserted and only the Sisimiut area in central West Greenland is inhabited (Gotfredsen and Møbjerg 2004:200ff). Due to a plateau in the calibration curve about 800–400 cal B.C., we cannot follow the details of the terminal phase here, but it is a fact that no Saqqaq site is later than this plateau.

Just before 800 cal B.C. and probably during the time span of the “radiocarbon plateau,” new Paleoeskimo groups expanded to High Arctic Canada, and eventually they reached the “Gateway to Greenland” (Schledermann 1990:127–200). One of the groups, the “Greenlandic Dorset,” soon followed ancient tracks into landscapes where the “true pioneers,” 1,700 years before them, had begun the human settlement of Greenland (Grønnow and Sørensen 2006:61–65).

Isolation?

The subsistence strategies and demography of the earliest Paleoeskimos in Greenland were dynamic, but the pioneer societies seem extremely conservative through time as judged by their material culture. There is no simple explanation of this phenomenon, but no doubt Greenland’s geography played a role. During periods when the High Arctic was abandoned, human societies further south in Greenland became isolated. There is, as mentioned above, clear archaeological evidence for sporadic presence of Pre-Dorset and, at a later stage, different Dorset groups in the Ellesmere and Thule area (Schledermann 1990; Sørensen 2010:96–117; Sutherland 1996), but there are at present no dates or finds which document Saqqaq or Independence I presence in this area at the same time as these visitors. In conclusion, Independence I and in particular Saqqaq people probably lived in relative isolation, with no or little opportunity to exchange information with Paleoeskimo cultures in other regions of the Arctic.

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CHAPTER 31

GREENLANDIC DORSET

JENS FOG JENSEN

“GREENLANDIC DORSET” embraces the archaeological traditions in Greenland which in older literature were designated Dorset, Early Dorset, Dorset I, and Independence II. Greenlandic Dorset was introduced by scholars in 2006 (Grønnow and Sørensen 2006) in order to cope with the problem that radiocarbon dating, stylistic variation, dwelling types, and raw material preferences did not seem to support the older distinction between Dorset I and Independence II (Jensen 2006a). Artifacts from Greenlandic Dorset have been found throughout Greenland, indicating that the arrival of Greenlandic Dorset represents a second episode of circum-Greenlandic settlement initiated by the arrival of new populations in the Nares Strait region around or shortly prior to 800 B.C. From this area, Greenlandic Dorset dispersed south across Melville Bay into West Greenland, where they established new settlements at or near many of the localities that formerly had been occupied by the Saqqaq people. Another, probably smaller group of Greenlandic Dorset seem to have traversed north around Greenland into Peary Land (Knuth 1968). However, with just 12 Greenlandic Dorset sites known from northernmost Greenland (Grønnow and Jensen 2003), the density of the Greenlandic Dorset occupation in this region does not compare to that of the older Independence I occupation of the same area. The Greenlandic Dorset must have left Peary Land quickly and dispersed back toward Nares Strait or south along the coast of northeast Greenland, where Greenlandic Dorset settlements are more numerous than they are in Peary Land. In the coastal regions of northeast Greenland the primary attraction appears to have been polynyas, which sometimes might have hosted walrus, as they do today. The open-water area and recurring ledge in the landfast ice extending from Kap Skt. Jacques on Ile de France in northeast Greenland was so attractive to Greenlandic Dorset that the largest (in terms of number of dwellings) known Paleoeskimo occupation ever recorded is located here. In West Greenland, the Greenlandic Dorset that followed the footsteps of their Saqqaq predecessors south across Melville Bay settled all of the major fjord systems. Their traces have been found all around southernmost Greenland (Raahauge and Appelt 2002), and from southeast Greenland (Jensen 1996) to northeast Greenland (Tuborg and Sandell 1999). As is the case with most other early Paleoeskimo archaeology

in Greenland, most of the excavated localities are from central West Greenland (Jensen 2006b) or northeast Greenland, where the lifelong endeavor of Eigil Knuth resulted in many well-mapped Paleoeskimo localities (Knuth 1967). In the following sections, Greenlandic Dorset will be characterized by focusing on themes of chronology, lithic technology, organic artifacts, architecture, economy, and settlement patterns. Finally there will be a description of some of the recently excavated sites from West Greenland and of the Greenlandic Dorset settlement at Kap Skt. Jacques, northeast Greenland.

CHRONOLOGY: STRATIGRAPHY AND RADIOCARBON DATING

The chronology and culture history of Greenland is convincingly seen in stratified sections, where Greenlandic Dorset culture layers are superimposed on older layers from the Saqqaq culture (Larsen and Meldgaard 1958). Seven such stratified deposits are known. Unfortunately, they are all from Disko Bugt or the vicinity of the Nuussuaq Peninsula just north of Disko Bugt in West Greenland, so this stratigraphical evidence may be argued to be geographically skewed. However, in six of the seven localities where layers from Greenlandic Dorset are superimposed on older layers from Saqqaq, sterile deposits separate the Greenlandic Dorset layers from the older Saqqaq layers. Only a few of the stratified deposits are well dated and meticulously investigated, but the evidence does seem to indicate that many of these localities were left untouched by humans over a period of time between when Saqqaq and Greenlandic Dorset flourished. One of the well-documented sections is section A from the Qajaa site (Meldgaard 1983), where the Saqqaq and Greenlandic Dorset layers are separated by 20–30 cm thick layers of peat. The evidence from Disko Bugt thus indicates that in this area, the Saqqaq culture had vanished prior to the arrival of Greenlandic Dorset, and that Greenlandic Dorset must represent a migration of new peoples into the area. However, only a few hundred kilometers further south, the radiocarbon dates from the Saqqaq site of Nipisat (Gotfredsen and Møbjerg 2004) indicate that Saqqaq culture might have overlapped with the presence of Greenlandic Dorset in Disko Bugt, or continued until the onset of Greenlandic Dorset. Therefore, in contrast to the stratigraphy, radiocarbon dates do allow for an overlap or contact between Saqqaq and Greenlandic Dorset. However, there are no Dorset or Saqqaq sites with stylistic or typological evidence of contact between the two, even though the occurrence of “polished beveled” points at the Saqqaq site of Nipisat, has led to the suggestion that the youngest Saqqaq phases were influenced by Greenlandic Dorset (Grønnow and Sørensen 2006). In a geographical scale there is no single region showing temporal overlap. Only future excavations can reveal whether this lack of evidence results from the fact that relatively few Greenlandic Dorset sites have been excavated or indeed the area of central West Greenland south of Disko Bugt became a Saqqaq refuge where the last Saqqaq thrived simultaneous with the spread of Greenlandic Dorset in more northern regions.

Precise radiocarbon dating of Greenlandic Dorset sites is very difficult, since most dates fall within the large plateau on the calibration curve between 850 and 400 cal B.C. (Guilderson 2005). However, the suite of reliable radiocarbon dates does include two dates that are earlier than the plateau, one on muskox bone from northeast Greenland and one of locally grown wood from west Greenland (Table 31.1, Figure 31.1). These two dates indicate that Greenlandic Dorset must have arrived in Greenland shortly prior to 800 cal B.C., leading to the possibility that they met with the last Saqqaq people in west Greenland. A graphic illustration of calibrated terrestrial radiocarbon dates for Greenlandic Dorset (Figure 31.1) shows two distinct clusters corresponding to two massive wiggles in the calibration curve; one large plateau between approximately 850 and 400 cal B.C. and a slightly shorter plateau from 350 to 200 cal B.C. After this latter plateau, there are only two problematic dates on peat, which likely should be disregarded. So presumably Greenlandic Dorset disappeared prior to 1 cal A.D. After Greenlandic Dorset disappeared, Greenland was depopulated for around 700 years until Late Dorset peoples settled on the Greenlandic side of Nares Strait around 700 cal A.D.

LITHIC TECHNOLOGY

The differences between the technology and tool inventory of Greenlandic Dorset compared to the older Independence I and Saqqaq cultures are broadly comparable to the differences between Early Dorset or “transitional” groups and their Pre-Dorset predecessors in Arctic Canada. Dorset traits such as tip fluting, concave-based triangular endblades, and harpoon heads with closed sockets are not known from Greenlandic Dorset. In terms of typology, the lithic tool types that are most easy to identify as Greenlandic Dorset are burin-like tools (Figure 31.2:1), and side-notched endblades (Figure 31.2:5, 6). In addition, scrapers with flaring edges (Figure 31.2:16, 17) are also relatively easy to differentiate from Saqqaq and Independence I scrapers. Microblades often make up more than 50 percent of the formal tools in Greenlandic Dorset assemblages, which in West Greenland contrasts with Saqqaq assemblages in which microblade production was limited. In general, lithic inventories from Greenlandic Dorset are characterized by a preference for colorful microcrystalline quartz types, including agate and quartz crystal, for tool production. As a result, during survey it is quite often possible to tentatively date sites based on the relative frequency of different raw materials in exposed debitage scatters. Well-excavated Greenlandic Dorset sites all display a fully developed suite of artifacts, and there are no excavated localities where the inventory has characteristics of being transitional by displaying a gradual change from Saqqaq types to Dorset types. For example, there are no sites apart from those with mixed inventories which see a gradual change from struck burins to the fully polished burin-like tools, such as have been reported from southern Baffin Island (Maxwell 1976).

Chaîne opératoire analysis of Dorset I and Independence II inventories (Sørensen 2011) show that the two traditions cannot be separated technologically. However, the

Table 31.1 Radiocarbon Datings of Greenlandic Dorset sites

Lab. No.	Site Name	Material	Species	¹⁴ C Age b.p.	±	δ ¹³ C	Cal b.c. ± 1 Standard Deviation	Ref. No.*
AAR-3951	Eigil Knuth Site 34	bone	<i>Ovibos moschatus</i>	2705	50		895–810	
Ka-6992	Kangerlussorissunnguup Kangia C	charcoal	<i>Salix</i> sp.	2680	40	–25.4	895–870, 850–800	1
K-5009	Vandfaldsnæs, 11	bone	<i>Ovibos moschatus</i>	2570	70	–19.5	810–740, 690–660, 650–540	2
AAR-1779	Mågefjeldet 4	bone	<i>Ovibos moschatus</i>	2550	80	–20.5	810–720, 700–540	
K-5007	Deltaterrasserne, 18	bone	<i>Ovibos moschatus</i>	2550	70	–20.5	810–730, 690–660, 650–540	2
AAR-8408	Kangerlussorissunnguup Kangia	charcoal	<i>Betula nana</i>	2535	30	–24.50	800–740, 690–660, 650–590	1
AAR-2351	Annertusuaqqap Nuua	charcoal	<i>Betula nana</i> , <i>Salix</i> sp.	2530	75	–23.4	800–720, 700–540	1
AAR-3941	Eigil Knuth Site 4	bone	<i>Ovibos moschatus</i>	2520	50	–20.00	790–730, 690–660, 650–540	5
K-1059	Hellebæk, A+B	charcoal	<i>Salix</i> sp.	2510	110		800–510	2
AAR-1770	Eigil Knuth Site 8	bone	<i>Ovibos moschatus</i>	2510	90	–20.20	790–520	5
Ka-6991	Innartalik	charcoal	<i>Salix</i> sp.	2490	45	–25.8	770–530	1
Kia25371	Itilleq lag 5	charcoal	<i>Betula nana</i>	2475	25	–26.03	760–680, 670–610, 600–530	3
K-5077	Kap Holbæk, IV	bone	<i>Ovibos moschatus</i>	2460	75	–18.1	760–680, 670–610, 600–480, 470–410	2

AAR-2343	Annertusuaqqap Nuua	bone	<i>Rangifer tarandus</i>	2460	70	−18.7	760–680, 670–610, 600–480, 470–410	1
AAR-3939	Eigil Knuth Site 1	bone	<i>Ovibos moschatus</i>	2455	45	−20.00	750–680, 670–640, 590–480, 470–410	5
K-5528	Frands Site	bone	<i>Ovibos moschatus</i>	2450	80	−22.20	750–680, 670–640, 600–410	5
K-4259	Kap Holbæk, II, A	bone	<i>Ovibos moschatus</i>	2450	70	−20.6	750–680, 670–640, 590–410	2
Ua-1559	Qeqertarsuup tunua	antler	<i>Rangifer tarandus</i>	2435	100		750–680, 670–640, 600–400	1
K-3363	Kap Mylius-Erichsen, 1	bone	<i>Ovibos moschatus</i>	2430	75	−20.4	750–680, 670–640, 590–580, 560–400	2
K-5008	Vandfaldsnæs, 9	bone	<i>Ovibos moschatus</i>	2430	70	−20.4	750–680, 670–640, 560–400	2
K-3055	Saattorsuaq square B	charcoal	<i>Salix</i> sp., <i>Betula nana</i>	2420	75	−23.7	750–680, 670–640, 560–400	1
K-5931	Nr. Mellemland 1	bone	<i>Ovibos moschatus</i>	2400	75	−21.6	750–680, 670–640, 550–390	5
K-4499	Deltaterrasserne, 5	bone	<i>Ovibos moschatus</i>	2390	70	−19.9	740–690, 660–640, 550–390	2
K-3360	Juniskæret	bone	<i>Ovibos moschatus</i>	2370	75	−20.5	740–680, 670–640, 550–380	2
K-3361	Kap Ludovika	bone	<i>Ovibos moschatus</i>	2370	75	−20.7	740–680, 670–640, 550–380	2

(continued)

Table 31.1 Continued

Lab. No.	Site Name	Material	Species	¹⁴ C Age b.p.	±	δ ¹³ C	Cal b.c. ± 1 Standard Deviation	Ref. No.*
K-3770	Saqqaq East section 70v2-III	peat		2370	70	−24.1	740–690, 660–650, 550–380	1
K-3864	Engnæs 4	bone	<i>Ovibos moschatus</i>	2350	70		730–690, 550–360	2
Ua-1686	Kap St. Jacques, 426	bone	<i>Ovibos moschatus</i>	2340	70	−20.5	710–690, 540–350, 290–230	2
AAR-8410	Nerukinnera 52/205:2	charcoal	<i>Betula nana</i>	2310	30	−25.66	405–370	1
Ka-6164	Anarnitsoq	charcoal	<i>Empetrum</i>	2310	55	−24.4	420–350, 300–210	
Ua-2165	Tasilik	charcoal	<i>Salix</i> sp.	2310	90		520–340, 320–200	1
AAR-1024	Nr. Mellemland 1	bone	<i>Ovibos moschatus</i>	2275	75	−20.5	410–340, 320–200	5
AAR-1015	Frands Site	bone	<i>Ovibos moschatus</i>	2265	60	−20.4	400–350, 300–200	5
AAR-1025	Nr. Mellemland 4	bone	<i>Ovibos moschatus</i>	2265	60	−20.9	400–350, 300–200	5
K-3769	Sermermiut section 13 H layer 4	peat		2260	70	−25.0	400–340, 320–200	1
AAR-8411	Nerukinnera 50/200:3	charcoal	<i>Betula nana</i>	2230	45	−26.91	380–340, 310–200	1
K-3902	Qajaa, E	peat		2210	70	−24.4	370–200,	1
AAR-2350	Orpissooq West	bone	<i>Rangifer tarandus</i>	2200	65	−18.0	370–190	1

AAR-2709	Orpissoq East 197/196:4	bone	<i>Rangifer tarandus</i>	2175	55	−17.8	360–270, 260–160	1
AAR-8409	Umiartorfik 99/91:3	charcoal	<i>Betula nana</i>	2170	30	−26.79	360–290, 230–220, 210–170	1
K-5970	Frands Site 2	bone	<i>Ovibos moschatus</i>	2160	75	−20.9	360–280, 260–100	5
K-3771	Saqqaq East section 70v2-III	peat		2160	70	−23.8	360–280, 260–110	1
K-3152	Aasivissuit	bone	<i>Rangifer tarandus</i>	2150	75	−18.7	360–280, 240–90, 70–50	4
K-3898	Qajaa, A	peat		2150	75	−25.1	360–280, 240–90, 70–50	1
Kia25372	Itilliq, Lag 6	charcoal	<i>Betula nana</i>	2130	40	−27,36	350–320, 210–90	3
K-515	Sermermiut B, section I	peat		1910	100		20 b.c. – a.d. 240	1
K-3903	Qajaa, E	peat		1860	70	−24.7	a.d. 70–240	1

* References: (1) Jensen 2006b; (2) Grønnow and Jensen 2003; (3) Raahauge et al. 2005; (4) Grønnow et al. 1983; (5) Andreassen 2004 (hitherto only published calibrated).

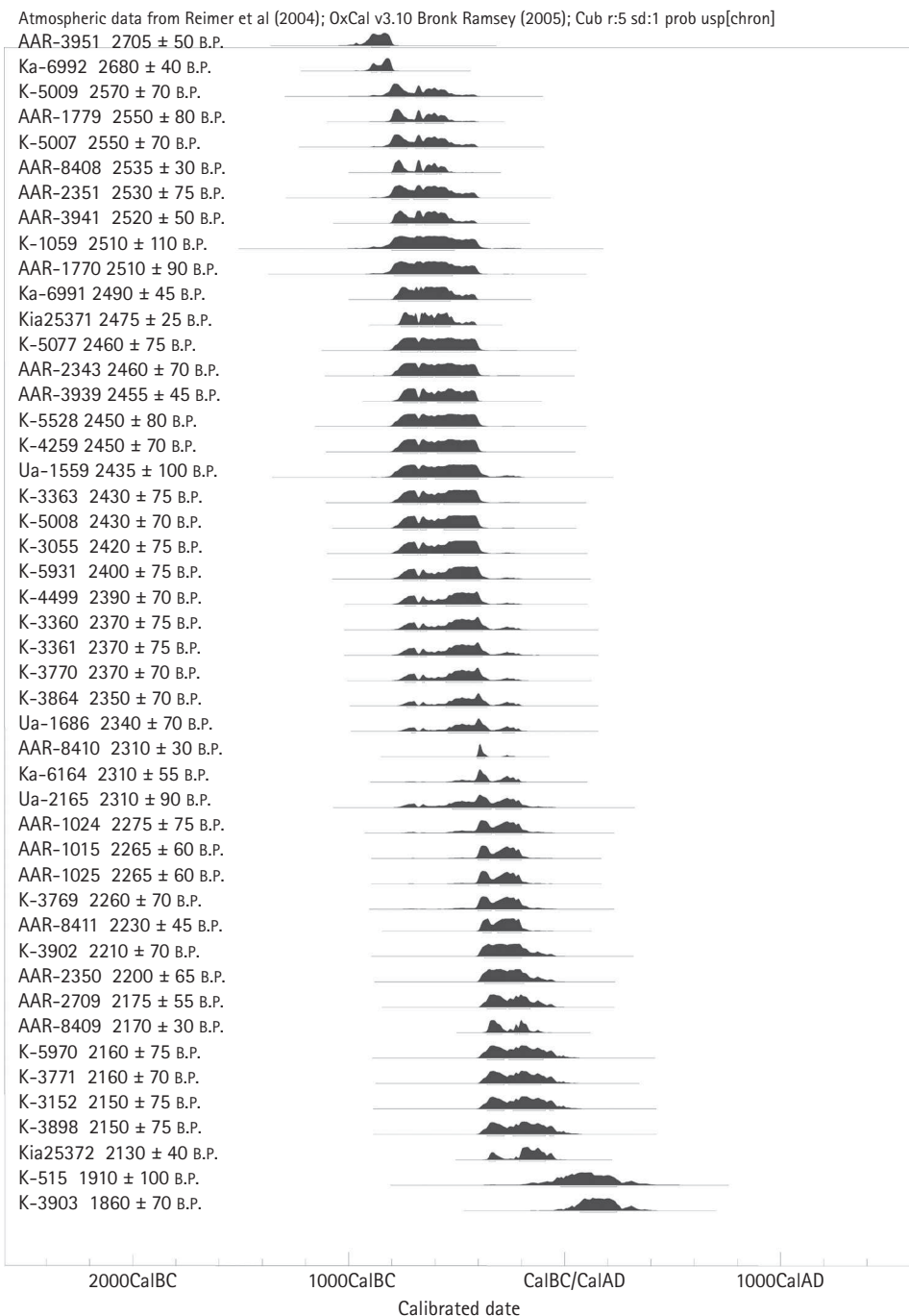


FIGURE 31.1 Plot of calibrated Greenlandic Dorset radiocarbon dates from Greenland. The three youngest dates all on peat are probably too young and should be disregarded when drawing cultural historical conclusions.

Illustration by Jens Fog Jensen based on OxCal 3.10

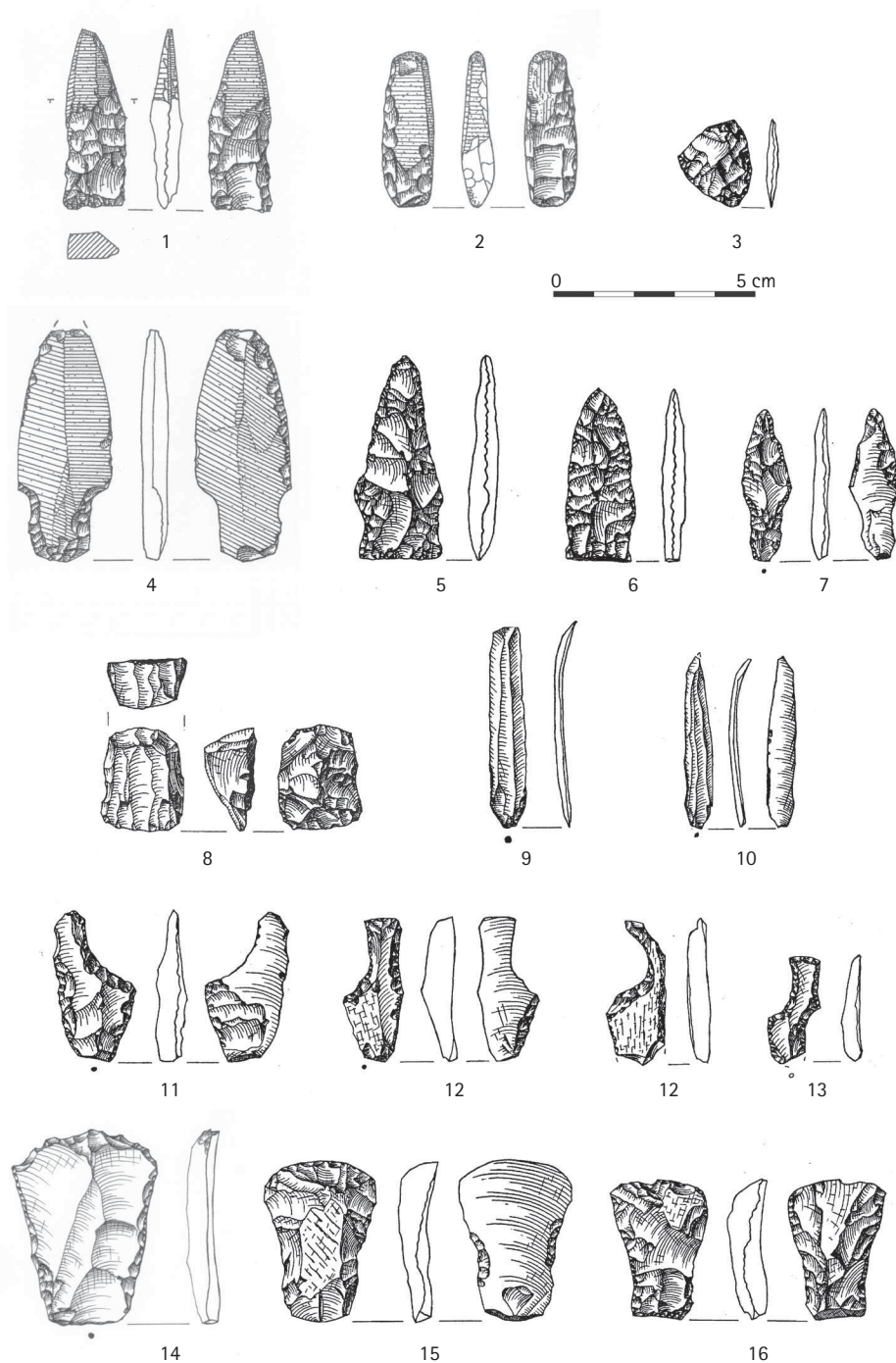


FIGURE 31.2 Lithic tools from Greenlandic Dorset sites in West Greenland. (1) Burin-like tool; (2) “strike a light,” presumably made on reworked burin-like tool; (3) sideblade; (4) polished tanged point; (5–6) side notched bifaces; (7) atypical tanged point produced from blade; (8) microblade core; (9–10) microblades, laterally finely retouched for hafting; (11–13) sidescrapers; (14–16) endscrapers.

Drawings by Lykke johansen

“classic” Independence II sites of Vandfaldsnæs and Kap Holbæk (as well as other Independence II sites in Peary Land) share a slightly reduced number of tool types when compared to contemporaneous sites in West Greenland. Polished curved knives, polished knives, polished points (Figure 31.2:4) and also lamps are thus absent on the Greenlandic Dorset sites in Peary Land formerly called Independence II. Similarly, Sørensen notes that the Peary Land sites are characterized by raw materials different from those known from Greenlandic Dorset in northeast Greenland, indicating that the peopling of Greenland during Greenlandic Dorset occurred in a clockwise migration along the northern shore of Greenland into Peary Land and a counterclockwise migration from Nares Strait region into West Greenland, around the southernmost tip of Greenland and then north along the east coast into northeast Greenland, where the Dorset people may have found the remnants left behind by their relatives who chose the migration route north around Greenland.

If this scenario is correct, then the Greenlandic Dorset migration into Greenland is strikingly similar to the arrival of Saqqaq and Independence I cultures more than one and a half millennia earlier, and the geographical dispersal of Greenlandic Dorset is also remarkably similar to the more recent peopling of Greenland by the Thule people (Gulløv 1997). In all three of these cases, the populations of northeast Greenland appear to have been smaller and more vulnerable than the populations that grew and spread in West Greenland. Based on a study of raw materials and manufacturing techniques, Sørensen (2011) found that burin-like tools found at Kap Skt. Jacques indicate that the Greenlandic Dorset settlers at Kap Skt. Jacques arrived from the south, and not from Peary Land in the north. The Greenlandic Dorset who settled in East Greenland thus largely appear to be Greenlandic Dorset of West Greenland origin who rounded the southernmost tip of Greenland and settled East Greenland in a northward migration that eventually reached all the way to Ile De France and adjacent regions in northeast Greenland. The Greenlandic Dorset groups that arrived at Peary Land along Greenland’s northern shore must have left Peary Land within a few years, because we know only eight campsites in this region (Grønnow and Jensen 2003). Their possible relations to more southern regions remain to be properly understood.

In West Greenland the colorful agate and chalcedony varieties preferred by Greenlandic Dorset are supplemented by the use of killiaq, a locally available metamorphosed slate that earlier was preferred by Saqqaq people for lithic tool manufacturing. Greenlandic Dorset used the killiaq for the production of specific tool types that often involved polishing: axes, burin-like tools, polished curved knives, polished knives, and polished endblades (see Figure 31.2:4). Soapstone was used for the production of lamps, buttons, and approximately 15 cm oblong objects with a hexagonal or octagonal cross-section. These are often found in or near the hearth and several of the specimens are scorched, indicating that their unknown function must have been related to the use of fire. In spite of the more common use of killiaq for polished blades in West Greenland, and the lack of use of soapstone on Greenlandic Dorset sites in northeast Greenland and Peary Land, the fundamental scheme of lithic tool production (the *Chaîne opératoire*) is so similar that Sørensen (2011) found the distinction

between Dorset I and Independence II unwise. In northeast Greenland as well as the remainder of Greenland, most of the Greenlandic Dorset lithic tool production is based on utilization of locally available raw materials, and most bifaces are produced from large flakes and not from bifacial cores, as was the case during Saqqaq and Independence I. This change in mode of production constitutes a fundamental difference between Saqqaq and Greenlandic Dorset, together with the changes in hafting technique that are indicated by the shift from tanged points characterizing Saqqaq and Independence I bifacial tool production to the side-notched bifaces dominating in Greenlandic Dorset.

ORGANIC ARTIFACTS

Only limited organic tools are known from Greenlandic Dorset. The largest inventories of bone, antler, and tooth are from northeast Greenland, where some of the localities have several well-preserved harpoon heads, cloven-hoofed lances, needles with oblong carved eyes, as well as other rare objects such as beads of teeth with elongated gouged holes and artifacts of unknown use (Andreasen 2004; Knuth 1968).

In West Greenland, implements of organic material are preserved only to a limited extent on a few Greenlandic Dorset sites. Harpoon heads are the most numerous (Figure 31.3). They are all open-socket variants comparable to Tayara Pointed, Tunit Open-Socket, and Tayara Sliced types from Arctic Canada (Collins 1956:Plate 1; Desrosiers et al. 2006:136; Taylor 1968). The harpoon heads occur as self-bladed types without barbs, as well as barbed varieties. From northeast Greenland there is a single specimen with a blade bed, found at the Lolland Sø site (Knuth 1968). Curiously, a similar specimen has been found at the Winsted site in the Nares Strait region (Andreasen 2000), but this harpoon head appear to be in a late Pre-Dorset context, which might underline the general ancestry of Greenlandic Dorset in the Pre-Dorset. The cloven-hoofed lance is another characteristic type of organic artifact that, in addition to localities from Arctic Canada, so far is known only from localities in north Greenland. Presumably they were used for big-game hunting, in particular muskox. Toward their bases, cloven-hoofed lance heads often have side slots in which oval to lanceolate bifacially chipped stone sideblades were inserted. Also characteristic are needles, delicately polished and with an oblong gouged or carved hole in contrast to the round holes seen in older bone implements from Saqqaq and Independence I. The remainder of Greenlandic Dorset artifacts of organic material are little known, but the finding of a sled shoe of whale bone from the site of Annertusuaqqap Nuua (Jensen 2006b: 147) and a snow knife blade from the Malmquist site, indicate that Greenlandic Dorset may have developed a more specialized ice and snow technology than the older Stone Age cultures. From the site of Vandfaldsnæs in Peary Land there are two tooth pendants made of perforated muskox teeth, and Knuth (1968) also suggested four bone pins from the same site served an ornamental purpose.

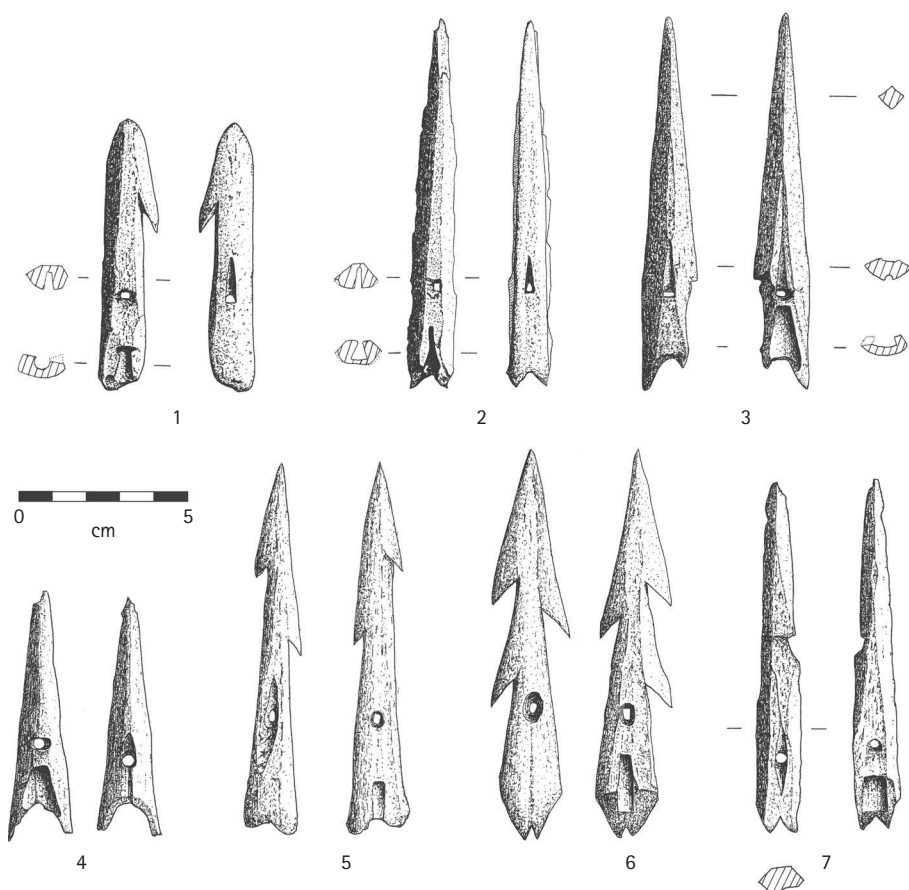


FIGURE 31.3 West Greenland harpoon heads from Greenlandic Dorset: (1) Nuussuaq Peninsula; (2) Malmquist's site; (3) Annertusuaqqap Nuua; (4) Marrat, Nuussuaq (L 64633); (5) and (6) Pfaffs collection; (7) Nuussuaq peninsula west Greenland.

Drawings by Jens Fog Jensen

HOUSING

Well-preserved dwellings are known from northeast Greenland (Grønnow and Jensen 2003; Knuth 1968; Andreasen 2003), southeast Greenland (Jensen 1996), and from the area of Disko Bugt in West Greenland (Jensen 2006a, 2006b). At least three different standardized dwelling types appear to have been in use: double-platform dwellings, mid-passage tent rings, and circular to oval tent rings with central hearth (Jensen 1998). In addition, there is a range of formal dwellings that fall outside these types, which may represent regional variation. There are also sites which exhibit only flagstone platforms, and campsites where no or only a few stones were used in the architecture. In some of the latter places, snow may have been used as building material, and in other cases tents

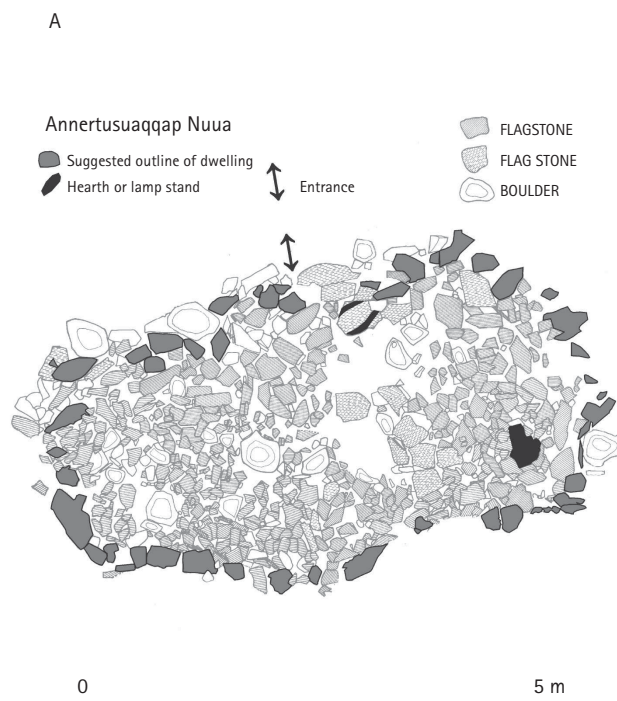


FIGURE 31.4a Ground plan of cold season dwelling at Annertusuaqqap Nuua. The hearths (marked by black fill) were seen as black deposits of fire-encrusted blubber. The suggested outline of wall marked by grey shading is defined by the flagstone pavement and a marked drop in artifact densities.

Illustration by Jens Fog Jensen

may have been erected without the use of anchoring stones or additional stone features, which leaves little archaeological evidence of a dwelling. In the following description, focus will be on the above-mentioned standardized dwelling types and their variations.

The double platform dwelling, believed to be a winter house, is exemplified by the structure at the site of Annertusuaqqap Nuua (Figure 31.4a). This dwelling type is characterized by an axially aligned central open floor space, which separates the 3–5 m diameter circular to oval interior into two often flagstone-paved platforms. In Disko Bugt, double platform dwellings were slightly excavated into the subsoil, and they characterize settlements that often have rich cultural deposits. Some of the double platform dwellings have associated faunal material indicating that they were used during the cold season (Jensen 2006b:165). The distributional pattern of artifacts inside the dwelling, as well as the occasional presence of two hearths or cooking areas, is believed to indicate that sometimes these dwellings held two families. The second type, consisting of mid-passage dwellings, consists of circular tent dwellings with a diameter of 3–4 m. Often the ring of stones that was used to hold the tent skin firmly marks the outline of the dwelling

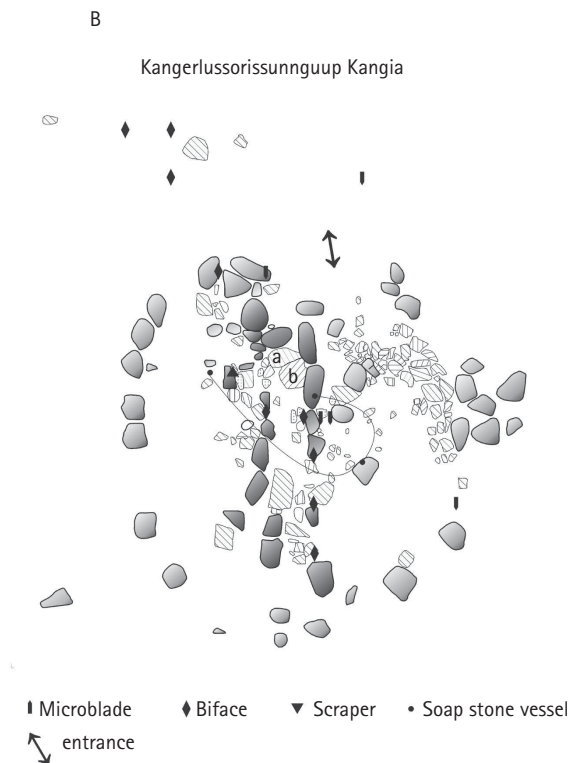


FIGURE 31.4b Ground plan of mid-passage ruin at Kangerlussorissunnguup Kangia. Distributions of formal tools are plotted.

Illustration by Jens Fog Jensen

(Figure 31.4b). In West Greenland, the mid-passages are built of rounded irregular stones set in two parallel rows from the entrance to the rear of the dwelling (Figure 31.4b). In the mid-passage there is a paved hearth marked by transversely placed stones separating the hearth or combustion area from the rest of the mid-passage. The hearth may be situated in the central part of the mid-passage or placed toward the entrance or rear part of the dwelling. Most often, the hearth is marked by ashes and soot, and sometimes a few fire-cracked rocks. The remainder of the mid-passage may be partially or completely paved with flat stones, and the passage can be divided into four to six compartments by additional stones or flags placed transversely between the parallel rows of stones forming the walls of the mid-passage (Knuth 1983). Sometimes the ground is also paved by flagstones along the exterior of the mid-passage, and sometimes there is flagstone pavement in other parts of the dwelling as well. For example, the mid-passage tent ring at the site of Kangerlussorissunnguup Kangia has a well-defined flagstone pavement in the entrance (Figure 31.4b). In one case, the lithic distribution associated with an isolated mid-passage tent ring “fans out” through the entrance in the front of the dwelling as well as toward the rear in the back of the tent, thus indicating the mid-passage dwellings of Greenlandic Dorset sometimes may have been equipped with a sort of rear entrance

(Jensen 2006b:102). The distribution of different artifact and raw-material categories further shows that often the space within mid-passage dwellings was tightly organized, with each person associated with fixed activity areas. In several instances, this has resulted in artifact distributions where microblades dominate the lithic inventory on one side of the mid-passage and other tools are concentrated on the opposite floor section.

In northeast Greenland the mid-passages were sometimes built by carefully selected thin flagstones set on edge, and the sides of the mid-passage construction tend to converge toward the front. Another characteristic of mid-passage features from north Greenland is the so called “wings” (Andreassen 2003:294; Knuth 1967:55) made of vertically placed flagstones that extend to the sides from the front and/or rear of the mid-passage, where they form a sort of platform edge or back rest as envisioned by Knuth. These characteristics are known exclusively from Peary Land and northeast Greenland where they add a regional characteristic to the Greenlandic Dorset formerly called Independence II.

Tent rings with central hearths are round to oval with a diameter of 3–4 m, and they occur in combination with mid-passage dwellings and on sites where more substantial winter dwellings have been excavated as well. The limited artifact inventories suggest that the tent rings with central hearth are temporary, probably mainly warm-season dwellings. The distribution of lithic artifacts in the tent rings with central hearths appears to be less confined to specific zones of the interior than was the case in the mid-passage ruins.

GREENLANDIC DORSET ECONOMY AND SETTLEMENT PATTERNS

As is the case for other hunter-gatherer cultures known from Greenland, the Greenlandic Dorset hunted most of the game species that their technology allowed. However, the few bones preserved at the investigated sites allow us only a limited insight into the character of the Greenlandic Dorset economy. In West Greenland, the harp seal (*Phoca groenlandica*) and ringed seal (*Phoca hispida*) dominate as the backbone of Greenlandic Dorset economy. However, the Malmquist site, situated in an inland region on the shore of one of the largest West Greenland fjords, has a large amount of preserved caribou (*Rangifer tarandus*) bones (Jensen 2006b:165). This locality demonstrates that specialized camps in the interior could have an economy quite different from that reflected by the preserved bones on coastal sites. The limited samples of preserved bone from Greenlandic Dorset sites do not allow for general conclusions on how the economy differed from that of the older Saqqaq culture. However, in spite of the statistically unreliable data, it is striking that several walrus (*Odobenus rosmarus*) and polar bear (*Ursus maritimus*) bones have been identified in the limited faunal material from Greenlandic Dorset sites of West Greenland. These species were also hunted by the Saqqaq, but they might have become more common in this region during the Dorset period due to climatic change.

It is also possible that technological and social changes or a combination of these factors facilitated a larger reliance on these game species.

Disko Bugt in est Greenland is well surveyed and was relatively densely populated during multiple periods, making it possible to compare the settlement pattern of Saqqaq to that of Greenlandic Dorset (Jensen 2006b). Generally, there are fewer sites from Greenlandic Dorset than from Saqqaq, and at the stratified site of Qajaa (Meldgaard 1983) the Greenlandic Dorset culture layers are much thinner than the deposits left during Saqqaq occupations. These differences probably result from several factors. First, Greenlandic Dorset lasted less than half the duration of the Saqqaq culture. Second, the Greenlandic Dorset layers at the stratified sites might be more severely affected by taphonomic factors, due to the more limited presence of permafrost in the upper Greenlandic Dorset layers. Third, the relative sea-level history may also have resulted in the destruction of more Greenlandic Dorset than Saqqaq sites, because the postglacial relative sea level was at its lowest during the period of the Greenlandic Dorset occupation (Rasch and Jensen 1997). Finally, the more sparse traces left by Greenlandic Dorset may to some extent also result from a lower population size. However, the general duration of the Greenlandic Dorset and taphonomic issues appear to be the most important factors explaining the differences in settlement density.

In general the settlements from the two periods cluster around the same hot spots in the landscape; and later Thule culture and historic Inuit chose the same locations. Therefore, even though there might be differences in the relative importance of different game species from one period to another, the ecological hot spots have been pivotal to all humans settling here. Similar to the preceding Saqqaq culture, Greenlandic Dorset positioned themselves with the more permanently settled (winter) camps at or near the most fertile hunting grounds, such as open-water areas at the outlets of large fjords, and with short-term camps focused on temporarily more limited resources such as arctic char (*Salvelinus alpinus*) or the collection of eggs in upland areas. Inland, there were camps focused on the exploitation of caribou. The suggested winter settlements are often situated at narrows or fjord outlets with strong currents, where open-water conditions occur early in the spring and where freeze-up is late in winter. In spite of the limited amount of preserved faunal material that has been found on the excavated Greenlandic Dorset sites, one might thus suggest that in West Greenland the economy and settlement pattern of Greenlandic Dorset closely resembled that of the Saqqaq.

Harp seal and ringed seal constituted the backbone of the Greenlandic Dorset diet, with the annual harp seal spring and fall migrations critical to the annual subsistence cycle. The ringed seal, on the other hand, was mainly caught at its breathing hole during winter or when basking on the ice in early spring. In the area to the south of Disko Bugt, the combination of open-water areas and the largest ice-free land areas in western Greenland resulted in a slightly different human ecology, with more emphasis on fishing and seasonal exploitation of caribou herds on the high plains. In these areas, the Greenlandic Dorset may have adopted a seasonal variation in the economy comparable to the ethnographically well-known Inuit dichotomy between winter camps at the seaside and summer hunting camps at the head of fjords or inland, where caribou hunting could be supplemented with char fishing in rivers. One of the radiocarbon dates from the archaeologically

and ethnologically investigated summer aggregation camp Aasivissuit (Grønnow et al 1983) indicates that this locality was frequented during Greenlandic Dorset.

In Peary Land and northeast Greenland, the preserved bone material from terrestrial fauna is dominated by muskox, but there is considerable variation in species composition between sites, as well as between different dwellings. Bones have been preserved in several ruins, but the individual samples are limited in size. Presumably, most camps are short-term settlements where just a few hunting and processing episodes are represented by the preserved bones. The interior lakeside site of Engnæs is dominated by arctic char. The fjord side settlements of Hellebæk, Deltaterrasserne, and Vandfaldsnæs have varied faunal assemblages dominated by seal, hare, fox, muskox, and goose bones.

Knuth collected 39 bone fragments from Feature 5a at Deltaterrasserne. Just over 50 percent of the bones were identified as muskox. The remaining fragments are hare (28.2 percent) and fox (20.5 percent). Nearly all the muskox fragments were recovered from inside or in front of the structure, whereas all hare and fox bones were recovered from a midden area to the east of the dwelling. In the absence of bird or fish, it is possible that this was a cold-season structure. However, one muskox deciduous molar appears to be from an individual less than six months of age, which suggests that this dwelling also was occupied for at least part of the summer. Feature 9 at the site of Vandfaldsnæs was relatively rich in faunal material, with a total of 250 bones and bone fragments. The identified portion of this assemblage is composed of 5.6 percent fish, 14 percent bird, 2 percent hare, 5.2 percent fox, 25 percent seal, and 12 percent muskox (Darwent 2003:346). At least one char, one cod, four geese (two juvenile and two adult), one duck, two ptarmigan, and one each of hare, fox, and muskox, as well as two seals, are represented by this assemblage. When summarizing the Independence I and Independence II fauna from Peary Land, Darwent (2003) found an increase in the relative frequency of seals in relation to other mammals during the later period. The increased focus on seal hunting during Greenlandic Dorset (Independence II) is suggested to result from climatic changes that were unfavorable for terrestrial mammals. A marine focus of the economy is also noted at the Eigil Knuth site, where walrus dominate among the identified faunal elements, and marine resources also dominate the sample from the large coastal site of Kap Skt Jacques, where ringed seal (59 percent) and polar bear (28 percent) are the most important resources.

REPRESENTATIVE LOCALITIES

In this section, three published localities will be described, to give an initial indication of variability in Greenlandic Dorset occupations. Given that the overall size of the presented campsites varies from a few hundred square meters to tens of thousands of square meters, it must be stressed that the presented facts are short generalizing extracts. The larger sites tend to include most if not all of the elements represented at the more temporary localities. Features such as the tent-ring dwellings may well also be represented on the localities that otherwise are characterized by cold-season dwellings.

Annertusuaqqap Nuua is a winter settlement situated near the end of a rocky promontory in the southern part of Disko Bugt (Jensen 2006b:117). Excavation revealed a $5 \times 2.5\text{--}3$ m level floor and platform area covered under ca. 50 cm thick deposits of peat and stones. The rear part of the dwelling is recessed slightly into the subsoil, and along the perimeter there are many large irregular stones, which may have been part of stone- and peat-built wall constructions. In some places flagstones had been stacked against the earth wall in the rear of the dwelling, but in general the outline of the dwelling is best defined by the combined evidence of the flagstone pavement combined with the distribution of artifacts. The dwelling is associated with a large lithic inventory consisting of 10,980 flakes and 617 tools. Most of these artifacts were recovered from the refuse area in front of the dwelling, but numerous tools ($n = 201$) were recovered from the floor area inside the dwelling. The concentration of lithic debitage in front of the dwelling results from a combination of primary reduction being executed in the open in front of the dwelling as well as from the dumping of debitage from knapping episodes occurring elsewhere. Inside the dwelling there was only a little refuse from primary lithic reduction. Broken discarded and abandoned tools make up a larger part of the lithic inventory inside the dwelling than they do amongst the artifacts left in the refuse area in front of the dwelling. In contrast to the temporary dwellings left on Greenlandic Dorset summer camps, here exemplified by the site Kangerlussorissunnguup Kangia (described below), the inventory at Annertusuaqqap Nuua stands out not only for its quantity but also in terms of qualitative measures; for example, much more primary lithic reduction has been executed on Annertusuaqqap Nuua than was the case in more temporary camps, indicating that raw material supplies were brought to and maybe cached at winter settlements. Similarly, there are also more bulky objects such as axes, soapstone lamps, and whetstones known from winter settlements. In addition to the presence of a few bones from typical winter game species such as ringed seal and polar bear, perhaps the most direct evidence of winter use of this settlement is the finding of a sled shoe of whale bone in the refuse layers in front of the dwelling (Jensen 2006b:147).

Kangerlussorissunnguup Kangia is an example of a temporary tent camp, presumably used during the warm season when capelin (*Mallotus villosus*) spawns in the waters of west Greenland. The site is situated in an archipelago environment 10 km southeast of the town of Aasiaat in the southern part of Disko Bugt, West Greenland. On the south-facing shore of the island Saqqaliuup Nunaa, the ice-scoured granite hills rise gently from the sea, and occasionally there are elongated ridges parallel to the shore, with sand and gravel terraces well suited for camping. At Kangerlussorissunnguup Kangia there is a well-preserved mid-passage tent ring with a flagstone platform in the entrance area (Figure 31.4b), and a few meters away there is an open-air hearth and a diffuse structure which could be a disturbed tent-ring dwelling or another open-air hearth (Jensen 2006b:107). The well-preserved mid-passage dwelling consists of an almost circular boulder tent-ring with an internal diameter of about 3.5 m. Externally, the diameter of the tent ring is 4–4.5 m, depending on where it is measured. From the south-facing entrance, the central axis of the dwelling is bisected by a north-south-oriented mid-passage approximately 3 m long and .8 m wide, constructed of elongated rounded boulders. At the rear, the mid-passage interior is paved with flagstones, and flagstones were also seen in the southern front part. However,

only some of the latter flagstones are used as pavement, since the excavation revealed that flagstones “a” and “b,” seen in the front part of the mid-passage (see Figure 31.4b), covered two other flagstones, which had been the original flooring of the hearth. Transversely in the mid-passage, and just at the end of the lower flagstones, there was a blackish trace in the subsoil, indicating that flagstones “a” and “b” originally were placed in an upright position around the hearth. A little ash and charcoal was found in the hearth, and seven fire-cracked rocks also lay scattered in the vicinity. The eastern part of the periphery is better preserved than the western. A heap of boulders near the southwestern part of the tent ring may be tent-ring stones that had been moved from their original positions, since the periphery is absent in the southwestern quadrant, where a pavement is situated toward the south-facing entrance. With a total of 15 tools and 291 lithic flakes and three pieces of a soapstone vessel, the artifact inventory appears to indicate that this was a short-term dwelling. All of the flakes are retouch flakes, indicating that no primary reduction occurred at the site. The lithics were concentrated along the mid-passage structure, and on the right side of the hearth structure when looking out from inside the dwelling. The mid-passage structure thus seems to have ordered the interior into different functional zones, even though the limited number of tools rendered difficult the separation of specific activity areas. A few meters in front of the dwelling a diffuse lithic scatter marks a refuse area.

Kap Skt. Jacques, Ile de France. In northeast Greenland, human settlement revolved around aggregation sites situated at polynyas (Grønnow et. al. 2011; Tuborg and Sandell 1999; Sørensen 2010). One of the most spectacular polynya-oriented sites is the settlement on Kap Skt. Jacques at the southwestern tip of Ile de France, 25 kilometers from the shore of northeast Greenland. With more than 500 features, this settlement is one of the largest Paleoeskimo camp sites known from the eastern Arctic. Just a few of the many features have been investigated, but the majority of the stone structures appear to result from Greenlandic Dorset occupations, even though a few structures could be of early Paleoeskimo origin and Thule culture is present at the locality (Grønnow and Jensen 2003:278). Many features remain to be described and categorized, but the majority of the structures can be characterized as the stone remains of portable dwellings with associated open-air hearths and caches. There are 274 features with a mid-passage arrangement, and of these, 47 are tent rings with a mid-passage, two are double tent rings with a mid-passage, and 225 are mid-passages with no visible periphery. Thirty-three features are caches, 16 are open-air hearths, five are pavements, three are tent rings with a central hearth, 26 are tent rings with no internal structures, and 33 are amorphous structures. The excavated structures are mid-passage features as well as more amorphous features with flagstone pavements. This difference in dwelling style might result from functional or seasonal differences in the use of the dwellings. One of the excavated features (Feature 305) is a double tent ring where two mid-passage tent rings are aligned, with a pavement between the two mid-passages where they appear to have shared a common entrance, but this particular feature might be related to earlier Paleoeskimo occupations, based on the high elevation of 19 meters above sea level, combined with raw-material composition and the presence of a burin spall. The remainder of the excavated features are confidently associated with Greenlandic Dorset occupations, since in most other ruins there

are enough lithic artifacts to clearly establish their cultural affinity. Feature 90 is a mid-passage feature of rounded stones without a periphery and partly overlaps an older mid-passage structure of flat stones (Grønnow and Jensen 2003:282). Seven microblades, one endscraper, one microblade core, and 98 flakes were found in association with this feature. Nearby this ruin is another mid-passage (Feature 101) where the boulder periphery was preserved. The periphery measures $3.6 \times 4.5\text{--}4.8$ m, with a disturbed mid-passage bisecting the interior along the short axis. A flagstone pavement covers large portions of the rear part of the northwestern floor area, but only a few stones are scattered over the southeastern floor area. In front of the entrance, numerous artifacts are scattered in a fan-shaped distribution with a distinct cluster of debitage toward the west. Many of the lithic artifacts associated with this feature were found in the refuse area in front of the periphery. A total of 244 microblades (including fragments), 17 bifaces, 7 side-blades, 13 endscrapers, 2 sidescrapers, 6 microblade cores, 11 other tools, and more than 800 flakes were collected (Grønnow and Jensen 2003). Approximately 80 percent of the lithic inventory was of quartz crystal, which puzzled Knuth during excavation and made it difficult for him to decide whether he should label Kap Skt. Jacques “Independence II” or “Dorset.” More recently, the analysis of Sørensen (2011) has shown that it is likely that at least the majority of excavated ruins at Kap Skt. Jacques were left by Greenlandic Dorset arriving from the south, and therefore only a few features have raw materials characteristic of the Independence II sites in Peary Land. The faunal assemblage from Greenlandic Dorset ruins is dominated by ringed seal ($n = 94$) and polar bear ($n = 46$), which to some extent contrasts with Thule-culture fauna from the same locality where, in addition to the most frequent bones of ringed seal ($n = 58$) and polar bear ($n = 25$), there are also 12 elements of bearded seal (*Erignatus barbatus*), and eight bones of nar-whal (*Monodon monocerus*). No bones from these last two species are present in the identified faunal assemblage dated to Greenlandic Dorset.

SUMMARY

In Greenland the term “Greenlandic Dorset” has made superfluous the regionally defined Independence II. Independence II has been considered an unfortunate term for some time, since it signals a relationship with Independence I in spite of an almost 1,000-year gap in the radiocarbon dates between the two (Schledermann 1990:325). Ramsden and Tuck (2001) warned against the invention of new taxonomic units that could end up “smearing the picture” rather than clearing up relationships between different cultural units. In this respect, one might object that the term “Greenlandic Dorset” solves the problem only when the geographic scale of inference is restricted to Greenland, because Independence II sites of the Canadian Arctic are left in a limbo. The chronological definition of Greenlandic Dorset might also cause some problems, since researchers working in the Canadian Arctic (Anton 2004:7; Desrosier 2009:433; Ramsden and Tuck 2001) increasingly adopt a culture-historical scheme, where Groswater, Independence

II, and “transitional” campsites are perceived as local evolutions of an early Paleoeskimo continuum. In this line of argument the term “Dorset” should be reserved to characterize only sites that display the full package of Dorset elements, which mark the beginning of the late “Palaeoeskimo” continuum.

Schledermann (1990) thinks of “Transitional,” “Independence II,” and “Early Dorset” as taxonomic units describing the material expressions left by different groups of prehistoric hunters passing through and living in the Bache Peninsula region of Ellesmere Island in the centuries between 800 and 500 cal B.C. Other authors have noted the rapid pace of change during this period, as shown in sites labeled “transitional” with a strong resemblance to “Independence II” by Damkjar (2003) in the central Arctic Archipelago, and “Groswater” in Labrador (Fitzhugh 2002). Thus, Greenlandic Dorset is one aspect of a particularly dynamic period in eastern Arctic prehistory, which saw significant culture change and movement, and which has resulted in the recognition of several regional variants (e.g., Maxwell 1985; Ryan, this volume, chapter 32). In Larsen and Meldgaard’s discussion, Independence II was characterized as “a Dorset culture,” and in their listing of independent immigrations to Greenland, they mention West Greenland Dorset separately from “classical” Dorset (Larsen and Meldgaard 1958:70). In spite of the above-mentioned problems of understanding the details of the cultural relations between Arctic Canada and Greenland over time and space, the geography of Greenland appears to have resulted in the isolation of small populations at several times throughout history, and “Greenlandic Dorset” appears to be an appropriate term for characterizing such an episode of migration and subsequent isolation in Greenland.

Greenlandic Dorset is thus perceived as the remains left by a migration of peoples arriving in Greenland via the Nares Strait sometime around 800 cal B.C. These new peoples dispersed north and south in clockwise and counterclockwise migrations, and in the following centuries they settled in all parts of Greenland. However, Peary Land must have been abandoned within a few years. In the following centuries, the Greenlandic Dorset probably became isolated in west Greenland, where the most viable population thrived. There are no culture traits indicating that Greenlandic Dorset took part in the gradual change that occurred in Arctic Canada during the same centuries. Therefore, there are no chronological subdivisions of Greenlandic Dorset apart from those indicated by radiocarbon datings, which indicate that the northernmost sites are represented during only the earliest centuries of Greenlandic Dorset.

The fate of Greenlandic Dorset remains to be discovered and described archaeologically. For the moment, we must rely on the sparse evidence from radiocarbon dating, suggesting that sometime around 1 A.D. all of Greenland was abandoned. Maybe the last Greenlandic Dorset returned to Arctic Canada, or maybe the population gradually contracted in the ecologically varied central part of West Greenland, as the Saqqaq population appears to have done 800 years earlier. One hopes that future research will enable a chronologically and geographically more detailed description of the course of events than is possible at the present, since much of our current archaeological knowledge is concentrated in a few regions.

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CHAPTER 32

THE “DORSET PROBLEM” REVISITED

*The Transitional and Early and Middle
Dorset Periods in the Eastern Arctic*

KAREN RYAN

INTRODUCTION

THE creation of culture histories that accurately reflect a region's record of human occupation should represent the fundamental first step in any interpretation of past human activities. These reconstructions must depend on well-documented sites and assemblages excavated from diverse parts of the region and bolstered where possible by suites of radiocarbon dates from secure contexts. Such culture histories should, as much as possible, be amenable to modification so that as new information is gathered, it can be placed within a consistently applied terminological framework that is able to include local developmental sequences and broader culture-historical relationships. Without first achieving this goal, archaeologists will neither agree upon past cultural processes nor have a suitable framework to address more complex subjects.

Nowhere is this clearer than in the centuries bracketing the beginning of the Dorset era. Here in particular researchers continue to grapple with very basic questions of cultural development, interaction, and transition, much of this resulting from a shared “laissez-faire” attitude toward the development of explicit and meaningful culture-historical terminology (Taylor 1968:38). Although attempts have been made to remedy this situation (e.g., Helmer 1994), they have been largely unsuccessful, as researchers continue to use what seem to be outdated and inaccurate terms when interpreting this era.

This chapter begins by reviewing the initial stages of Dorset archaeology before discussing the competing proposals meant to delineate the how, where, and why of Dorset

origins. From there, a brief overview of the Early and Middle Dorset periods as currently defined is provided. The chapter ends by discussing recent work which indicates that major revision of the eastern Arctic's culture-historical foundation is required.

THE INITIAL DEFINITION OF DORSET

Dorset was first recognized as a distinct cultural entity in 1925 by Diamond Jenness, who discovered its traces among a large collection of artifacts from unknown sites in northern Hudson Bay and Hudson Strait. While Jenness easily associated many of the artifacts with the ethnographically known Inuit and their Thule ancestors, he also isolated a group of approximately 500 specimens, whose form was "strange and unfamiliar" (Jenness 1925:434). Further distinguishing these implements by their deep brown patina, which he correctly supposed was due to their greater age, Jenness proposed the materials represented the remains of a hitherto unknown culture which predated the Inuit in the eastern Arctic by an equally unknown period.

Advancing the name "Cape Dorset," Jenness further supported his inference by noting that the Dorset objects he examined lacked the round drilled holes characteristic of Thule and Inuit material culture (compare Jenness 1925:Figures 5 and 6). Instead, Dorset craftspeople perforated their stone and organic tools by gouging them from opposing faces until an elliptical hole was created, signifying that "unlike all other Eskimos, [Dorset] were not acquainted with the bow drill" (Jenness 1925:435). Additional traits differentiating Dorset from the Thule Inuit included the style of several previously unreported harpoon heads (particularly those with closed square sockets), endblades with deeply concave proximal ends, asymmetrically shaped chert bifaces, and the form of an assorted group of stone tools.

Although the validity and antiquity of the Dorset cultural designation was initially questioned (e.g., Mathiassen 1927:164–165, 1930:595), its distinctiveness became widely accepted through the 1940s as Dorset remains were identified at a diverse range of sites extending north from Newfoundland to Greenland and as far west as Foxe Basin (see Maxwell 1985). While early research suggested a link between Dorset and southerly Amerindian populations (e.g., Jenness 1933), continued work has pointed to the Bering Strait region as the ultimate Dorset homeland (e.g., Collins 1953). Jenness, who as part of his original definition stated that Dorset was too developed to represent the first eastern Arctic occupation (Jenness 1925:437), subsequently made the bold suggestion that it dated prior to "the first millennium B.C." and shared a common ancestor with other prehistoric Alaskan occupations (Jenness 1940:9).

This hypothesis gained credence as work on Denbigh Flint Complex sites in Alaska demonstrated a greater Paleoeskimo time-depth than previously suspected (Giddings 1951; Irving 1968). Based on these findings, Collins (1951:428) proposed that the newly defined Arctic Small Tool tradition was the ultimate progenitor of Dorset, with its ancestors moving eastward from Alaska prior to the appearance there of Ipiutak and Old

Bering Sea groups (following Dumond [1987], these are subsumed under the broader Norton tradition).

Despite these advances, however, the question of whether Dorset predated Thule in the eastern Arctic was not firmly settled until sealed Dorset deposits underlying Thule levels were identified by Holtved (1944) and Collins (1950). Notably, Collins (1950:20–21, 28) attempted to develop a relative Dorset chronology, and situate his newly excavated sites within it, by proposing a preliminary harpoon-head typology using stratigraphic evidence in combination with several harpoon-head traits identified from preexisting collections. Unrecognized at that time, however, was that the harpoon heads used as fossil guides by Collins (1950:Plate V, 1–8) included examples dating from the Early through Late Dorset periods.

Building on Collins's efforts to construct an internal Dorset sequence, Meldgaard (1960a, 1960b, 1962) located a series of sites on the raised beaches of northern Foxe Basin spanning Pre-Dorset through Late Dorset. Dating the occupations relatively according to elevation above the active shoreline, a series of five phases (Dorset I–V) were proposed, with the earliest Dorset traces carrying a "smell of forest" interpreted as population discontinuity with earlier Pre-Dorset (Meldgaard 1962:95). Meldgaard saw abrupt technological and economic changes between the 23 m asl (above sea level) Pre-Dorset and 22 m asl Dorset I and II occupations, when groups appear to have been "stressed" by major environmental fluctuations (Meldgaard, in Maxwell 1985:121), as evidence that an expanding Gulf of St. Lawrence Dorset group had pushed northward to replace Pre-Dorset during a "critical period" lasting less than a century (Meldgaard 1960a:95).

Although a southern origin for Dorset was subsequently discounted (Harp 1964; Taylor 1968), Meldgaard's view of Dorset's sudden appearance, in combination with its apparently distinct sociotechnological adaptations, has had a lasting influence on eastern Arctic culture history. This is despite the fact that it is impossible to evaluate whether there truly was a population break between the latest Pre-Dorset and earliest Dorset levels in northern Foxe Basin, because detailed reports on those excavations remain outstanding; information must instead be gleaned from brief reports which lack "specific information as to how the two Sarqaq [Pre-Dorset] stages differ from one another or from Dorset I, the most crucial stage of the series" (Collins 1962:127).

Despite these shortcomings, continued research through the 1960s set the stage for what Collins (1958) and Taylor (1959, 1968) referred to as the "Dorset problem": establishing the origins of Dorset, defining its range of material culture, and determining its full geographic and temporal extent.

THE ORIGINS OF DORSET

While researchers worked to formulate a generally accepted framework broadly outlining the eastern Arctic's history of human occupation, the particulars of chronology, intercultural relationships, and the fate of variously named regional entities remained

contentious issues. No discussion seems to have polarized opinions more than the ongoing debate regarding where and how Dorset arose (e.g., Collins 1962; Cox 1978; Desrosiers 2009; Helmer 1980, 1994; Maxwell 1985:111–125, 1997; Meldgaard 1962; Nagy 2000; Schledermann 1978, 1990; Taylor 1962, 1968).

This is because while archaeologists generally concur that Dorset emerged in some manner from the preceding Pre-Dorset during a “transitional” period typically dated between 2800 and 2500 B.P., there is little agreement regarding the details of how, where, or why it occurred. It is also unclear what influences, if any, were exerted on these populations by other Arctic Small Tool tradition groups (see Arnold 1981; Fitzhugh 2002; Le Blanc 1994; McGhee 1971; Saville and Dyke 2014; Schledermann 1990). Attempts to address these questions have been stymied in part by problems with the radiocarbon dating method (Arundale 1981; McGhee and Tuck 1976), by confusion regarding what the “transition” actually entails (Nagy 2000; Schledermann 1990; Taylor 1968), and by more pervasive concerns regarding how archaeological “cultures” are recognized (Helmer 1994).

Compounding the difficulties associated with tracing how Pre-Dorset became Dorset is the fact that “since the majority of cultural traits persist from Pre-Dorset into Dorset with only slight stylistic variation, it is difficult to define the differences between late sites of the one and early sites of the other” (Maxwell 1984:363), a problem worsened when researchers “emphasized the sequence or transition between Pre-Dorset and Dorset while simultaneously stressing cultural distinctions between the two . . . [and hence] effectively negated the concept of transition” (Maxwell 1997:205–206).

These issues notwithstanding, researchers seeking to understand how at least some Pre-Dorset transitioned into Dorset can generally be divided into three groups: those who favor a general transition into Dorset with population continuity in most areas; adherents of the Core Area Model (or the Core Pulsation Model), which envisions continuity only in the Foxe Basin; and researchers who posit “minicores,” allowing uninterrupted occupation in some regions but discontinuity in others. No matter the stance, climate instability and environmental change are typically evoked as the underlying cause for the development of Dorset.

Pre-Dorset–Dorset Continuity

Those favoring widespread population continuity and local development from Pre-Dorset into Dorset envision the 2800–2500 B.P. period as a time of insecurity and change, as a comparatively stable Pre-Dorset socioeconomic system was reorganized over a short time into a recognizably Dorset form, with a more sedentary socioeconomic system that placed greater emphasis on marine hunting (e.g., Maxwell 1980, 1985).

Collins (1951) was among the first to propose that Pre-Dorset was ancestral to Dorset, although the most vocal proponent of this perspective was Taylor (1959, 1962, 1968), who argued that differences between Pre-Dorset and Dorset were being overemphasized while similarities were overlooked. Taylor (1968:80–81) agreed that Pre-Dorset and

Dorset should be distinguished, but he also pointed out that the origins of Dorset would be impossible to identify if research focused only on differences between it and earlier populations. Wary of the issues posed by inadequate sample sizes, uneven regional representations, and interpretations relying on negative evidence, Taylor (1959:42) instead concentrated on traits common to Pre-Dorset and Dorset, adopting a broad view of the "transition" as a period of cultural transformation and not outright replacement.

By not setting Pre-Dorset and Dorset in opposition to one another, Taylor (1959:40, 1968:83; *contra* Meldgaard 1960a, 1960b, 1962) envisioned a relatively balanced Pre-Dorset population evolving over several centuries into a recognizably Dorset entity. With an eye to "continuity with change" (Taylor 1968:83), Taylor first compared Pre-Dorset and Dorset assemblages from northern Hudson Bay and Hudson Strait with one another before expanding his study to include occupations he presumed to be of equivalent age in Foxe Basin and Hudson Bay.

Noting the persistence of lithic technologies between the two periods (including 27 shared traits), Taylor proposed that some Dorset technologies were clearly rooted in Pre-Dorset: notable are his suggestions that Dorset burin-like tools developed from Pre-Dorset ground burins, that three Dorset harpoons—Tyara Sliced, Dorset Sliced, and Frobisher Grooved (Taylor 1968:51–53)—derive from Pre-Dorset examples, and that the burin, supposedly restricted to Pre-Dorset sites, was actually used in both periods (Taylor 1968: 81–82, 84). Moreover, Taylor (1968:100–101) contended that 16 of the artifact classes used by Meldgaard (1962:Plate 5) to differentiate Pre-Dorset from Dorset actually co-occurred, inferring that "the general nature and content of early Dorset Eskimo culture stemmed predominantly from the Pre-Dorset culture" (Taylor 1968:103).

The Core Area Model and Pre-Dorset–Dorset Discontinuity

Although the existence of a central region of Paleoeskimo development had previously been suggested, it was not until the mid-1970s that the idea of a "Core Area" centering on Foxe Basin, northern Hudson Bay, Hudson Strait, and Baffin Island (Maxwell 1976:Figure 2, 1985:Figure 5.1) was fully developed. The Core Area Model was originally envisioned as an environmentally driven push-pull model of demographic development and change based on the premise that the eastern Arctic, excepting the Core Area, is an ecologically marginal and inherently unstable environment which periodically pushed the ability of some groups beyond their limit of survival (Fitzhugh 1976; McGhee 1976; Mary-Rousselière 1976; Maxwell 1976). The primary difference between this model and one of large-scale continuity is that although both acknowledge in situ Dorset development, the Core Area Model permits cultural and biological continuity only in the Foxe Basin area.

Accordingly, during periods of climatic amelioration, Core Area populations pushed into uninhabited "fringe" or "peripheral" zones (e.g., the High Arctic) carrying a suite

of distinct technologies and subsistence strategies developed in the core. Through time, these peripheral groups diverged, developing regionally distinct adaptations not reflected to the south. After some period, a combination of resource exhaustion and/or climatic deterioration either pulled these people back to the ecologically stable Foxe Basin, or caused their local extinction in a cyclical process permitting only the Core Area to maintain sociotechnological continuity.

McGhee (1976, 1981) believes that a pattern of cultural expansion, retraction or disappearance, and replacement occurred at least four times on Devon Island as Core Area populations repeatedly attempted to colonize the High Arctic. One migration occurred between 2800 and 2500 B.P., when Foxe Basin emigrants arrived at Port Refuge and thereafter fell out of communication with the Core Area. These settlers became increasingly regionalized and distinct, sharing more in common with contemporaneous Independence II populations in Peary Land (Grønnow and Jensen 2003), prompting McGhee to affiliate the transitional Port Refuge sites with that cultural group. At the same time, McGhee (1976:21, 27, 1981:36) did acknowledge strong similarities between the transitional occupation at Port Refuge and Core Area Early Dorset, parallels suggesting a degree of fringe-core communication and continuity may have been possible.

Further west, Helmer (1980) identified evidence that core and fringe populations may have interacted through the transitional period at sites on Karluk Island in McDougall Sound. Although a population break between Pre-Dorset and Dorset was inferred, with Core Area Early Dorset moving to repopulate the High Arctic, Helmer (1980:437–438) suggested Dorset possessed several artifact traits hinting at a High Arctic Independence II influence. Suspecting more continuity existed than typically allowed for by the Core Area Model, Helmer (1980:440) argued that demographic reconstructions required refinement in order to allow “in situ development, tempered by trait diffusion and possibly migration, as a viable alternative,” rather than only one-way development. Subsequent work elsewhere led Helmer (1991:311–312) to conclude that High Arctic populations immediately prior to 2800 B.P. had been subject to extraregional cultural influences, including trait diffusion, from both the north and south, lending High Arctic Early Dorset a unique flavor.

Despite its proponents, the Core Area Model has been consistently criticized for its reliance on the environment to force culture change, a “prime mover” which effectively disallowed so-called marginal populations any ingenuity or agency while also being unable to account for innovations and cultural continuities outside Foxe Basin (e.g., Bielawski 1988; Helmer 1980, 1991; Odess 2002; Schledermann 1978, 1990; Tuck 1976). Even McGhee (1976:27–28, 1981:37), a key supporter of the Core Area concept, appears to contradict a prime tenet of it, that population continuity and significant technological change occurred only in the Core Area, when acknowledging the possibility that Independence II developed in situ from Independence I and subsequently expanded south, bringing with it traits, like the axial feature, that were incorporated into emerging Dorset culture.

It is now reasonably well established that periods of extended continuity occurred in at least some “fringe” areas (Cox 1978; Schledermann 1978, 1990), while the utility of

the Core Area Model has been seriously undermined by new research in Foxe Basin, which indicates "that the traditionally accepted view of a 3,000-year stable occupation (approximately 4,000–1,000 B.P.) is untenable" (Savelle and Dyke 2014:273). Working on the outer edge of the Core Area, Odess (1998) has also questioned the validity of interpreting apparent stylistic "lags" as indicators of a fringe group's increased marginalization and isolation from the supposed Foxe Basin innovative center. He believes that Frobisher Bay Dorset persisted in making particular styles of harpoon head after they had been abandoned by Core Area Dorset not because those groups were too isolated to know they "should" switch, but because they chose to set themselves apart from nonlocal Dorset by maintaining a stylistic divide (Odess 1998:429).

As discussed by Fitzhugh (1997, 2002), although the Core Area Model as originally envisioned more or less fit the then-current picture of Paleoeskimo occupation, more recent work has demonstrated that many of the model's original assumptions are no longer accurate, while data used to support population discontinuities in peripheral locations (and the assumption of uninterrupted occupation within the core) are outdated. Based upon this, some researchers have proposed the original concept, reliant upon a single Core Area, be adapted to accommodate continued archaeological investigation.

"Regional Centers" and "Mini Cores": Paleoeskimo Continuity and Discontinuity

When the Core Area Model was developed in the mid-1970s, it incorporated the most up-to-date synthesis of information on the eastern Arctic's known population with new environmental and climatic data in order to reconstruct demographic movements and explain relationships throughout the region. While demographic data still indicate cyclical patterns of settlement and abandonment in some areas, research elsewhere has called the accuracy of the model into question, especially when it uses local data to infer larger-scale demographic patterns (Bielawski 1988; Cox 1978; Helmer 1980, 1991; Schledermann 1978, 1990).

Increasingly dissatisfied with the premise that long-term continuity occurred only in the Core Area, several archaeologists working outside Foxe Basin have highlighted a need for the model to be refined in order to better explain the more intricate demographic data and material culture variability brought to light by their analyses. As stated by Helmer (1991:316), "the broad regional models of Paleoeskimo cultural dynamics proposed in the past are empirically inadequate and should be abandoned in favor of more particularistic local reconstructions." Locations supporting extended Paleoeskimo sequences of occupation and complex interregional interaction include Labrador and Ellesmere Island; these demographically diverse areas are sometimes referred to as "ecological nodes," "regional centers," or "sub" or "mini" cores due to their extensive population histories.

Working in Labrador, Cox (1978), who generally agreed with the tenets of the Core Area Model, took issue with its inability to account for longer sequences of unbroken "fringe" occupation, the fact that so-called fringe groups maintained long-distance

communication networks with other peripheral populations rather than the core, and with the model's failure to account for local cultural developments occurring outside the Foxe Basin's influence. Cox's (1978) excavations demonstrated that populations in northern Labrador did not exhibit multiple cycles of settlement and abandonment as predicted by the model, but were instead associated with two long sequences of uninterrupted occupation: a Pre-Dorset–Groswater phase beginning before 4000 B.P. and ending approximately 2200 B.P.; and a Dorset occupation which started about 2500 B.P. and may postdate 500 B.P.

A comparison of Labrador Pre-Dorset assemblages with contemporary sites in other regions indicates that this population had ties with High Arctic Independence I and Saqqaq groups, a north-south connection which appears to have persisted through the transitional period based on similarities between Groswater and Independence II (e.g., Cox 1978; Fitzhugh 1976, 1980, 2002; Tuck 1976). According to Cox (1978:106, 114–115), this is because people in Labrador, Baffin Bay, and the eastern High Arctic Islands developed novel adaptational strategies, seen in similar technologies and inferred subsistence practices, in response to the unique environmental and ecological conditions of this large area. While transitional populations in Foxe Basin continued a developmental course which led to Dorset, contemporary Independence II and Groswater groups to the east followed a different path, probably diverging from the central Core Area after 2800 B.P. to form an "eastern core area," which persisted until after the arrival of Dorset at ca. 2500 B.P. (Cox 1978:114).

Following this period of in situ cultural continuity, the appearance of Dorset in northern Labrador marked both a population discontinuity with the Groswater and the beginning of a second sequence of occupation that lasted almost two millennia, although continuity through Dorset is assumed but not yet proved (Cox 1978; Fitzhugh 1972, 2002; Odess 2005; Tuck 1976). Further north on central Ellesmere Island, Schledermann (1978, 1990) also interprets the Paleoeskimo record as showing longer sequences of continuous occupation than predicted by the Core Area Model. Schledermann (1990:127, 166, 314) contends that the period between 2800 and 2500 B.P. was a culturally complex time in the Smith Sound region, with considerable cultural communication between Pre-Dorset populations in the High and Low Arctic, as well as with Saqqaq groups in Greenland. Unlike other parts of the High Arctic where population declines are suggested (e.g., McGhee 1976, 1981), Schledermann (1990:166–167) believes the period between 2800 and 2500 B.P. was a time of population growth, with ideas and people moving back and forth across Lancaster and Smith Sounds. These interregional interactions greatly influenced Schledermann's (1990:127–128, 166–167) view of the Transitional Independence II period, which he sees as an in situ amalgamation of Pre-Dorset and Saqqaq traits, echoing Cox's (1978:106) assessment of the situation in Labrador when he observes that "a meaningful distinction between the Transitional and the Early Dorset stage is very difficult to define" (Schledermann 1990:167).

Unlike Labrador, Schledermann (1990:174) believes that immigrant Core Area Early Dorset were quickly drawn in to and influenced by the distinct Bache Peninsula Transitional adaptation, adopting several Pre-Dorset–Saqqaq–Transitional cultural

elements including the axial feature, which may then have been brought into the Core Area (McGhee 1976:27–28, 1981:37). At the same time, Early Dorset, grouped within the Transitional phase by Schledermann (1990), appear to have maintained contact with core groups, demonstrating “that a more or less continuous exchange of traits and probably populations took place between the Central, Eastern, and High Arctic regions” early in Dorset, after which the High Arctic was abandoned (Schledermann 1990:175; also Helmer 1991).

Such far-flung Paleoeskimo interaction spheres are not unknown (i.e., the Core Area Model relies on long-distance communication to explain apparently simultaneous changes throughout the eastern Arctic), and Fitzhugh (1997:395; also Odess 1998) has suggested extensive communication networks were a critical social mechanism to counteract isolation and increase the chance of group survival during times of uncertainty. At the same time, both the Labrador and Bache Peninsula subcores do exhibit at least one major population break involving either the displacement and eventual replacement of a contemporary group (Groswater by Dorset in Labrador) or a repopulation event after an extended period of abandonment (a 1,200-year gap exists between Early and Late Dorset on Ellesmere Island and Greenland).

More recently, Grønnow and Sørensen (2006) have reexamined the Bache Peninsula assemblages and question Schledermann’s (1990) interpretation of in situ continuity between later Pre-Dorset, Transitional, and Early Dorset populations, suggesting the appearance of Early Dorset in the Smith Sound–North Water polynya area represents an intrusive population unrelated to Schledermann’s Transitional group. Accordingly, they consider Bache Peninsula assemblages containing a mix of Pre-Dorset–Transitional and Dorset elements to be Pre-Dorset sites that were contaminated by subsequent Dorset reoccupation, and not evidence of local population continuity (Grønnow and Sørensen 2006:64–65; see Nagy [2000] for a review of the conceptual problems underpinning these opposing interpretations).

CHARACTERIZING THE EARLY AND MIDDLE DORSET PERIODS

Despite continued disagreement regarding where, when, and why Dorset developed, researchers do share a common understanding of what “Dorset” as an archaeological culture represents. Unsurprisingly, there is less agreement concerning how the period has been subdivided, although an Early/Middle/Late classification is most commonly employed (e.g., Maxwell 1985; but see Desrosiers 2009 and Odess 2005).

Foremost among the traits distinguishing Dorset is the one noted by Jenness in 1925: the complete absence of drilling technology throughout the Dorset era. Additionally, although exceptions do occur (e.g., Le Blanc 1994; Mary-Rousselière 1976), the beginning of the Dorset era corresponds with a subsistence shift away from

what is often presumed to be a more general Pre-Dorset land-sea economy and toward a greater emphasis on marine resources (e.g., Darwent 2004, 2011; Murray 1999; Nagy 2000). The development of two differently sized versions of the Dorset Parallel harpoon head for use on small and large prey (Maxwell 1985:Figure 5.17; Taylor 1968:52) suggests that the Dorset had become regular hunters of walrus (and perhaps narwhal and beluga), a fact confirmed by the sudden appearance of large amounts of walrus bone in many Early Dorset middens (e.g., Darwent 2011; McGhee 1981; Maxwell 1976:61, 63; Murray 1999:474; Taylor 1968:52).

Seasonality and mortality patterns reconstructed from faunal assemblages indicate that Dorset hunters were adept at using the sea ice, taking prey from ice leads, the sina or ice edge, and perhaps directly from breathing holes (e.g., Darwent 2004; Maxwell 1974–1975; Murray 2005; Spiess 1978). There is also limited evidence for watercraft (e.g., Maxwell 1985:Figure 6.5). Related to the intensified use of marine species is an apparent shift in settlement patterning, indicated by a repositioning of sites in order to better access the sea ice (e.g., Cox 1978; Maxwell 1973, 1980, 1985:132–133). In contrast with earlier occupations, many Dorset sites have substantial architecture (including semi-subterranean dwellings) and deep midden deposits, indicating that overall mobility was reduced and larger site populations became possible as inhabitants used local resources more intensively (Darwent 2004; Maxwell 1973; Murray 1999; Nagy 2000). The occurrence of ancillary features including storage caches and pits further indicates a population that was able to generate reliable surpluses, possibly by exploiting previously underutilized animals (e.g., Murray 1999: Figure 5).

Early Dorset

The start of the Early Dorset era is generally placed between 2600 and 2500 B.P., with a terminus varying between 2300 and 2000 B.P. (Fitzhugh 2002:Figure 13.2; Helmer 1991:314; McGhee 1976:Figure 7; Maxwell 1984:367, 1985:168).

The beginning of the Early Dorset period broadly coincides with an episode of climatic cooling throughout the eastern Arctic that increased the longevity and extent of sea ice across much of the region (Barry et al. 1977:199). Such conditions benefit sympagic species, including ringed seal and walrus, although the extension of thick multi-year ice, through which breathing holes are difficult or impossible to maintain, would adversely affect their distribution (McLaren 1958). Similarly, while more extensive periods of ice coverage make polynyas the focal point for a diverse group of animals and their hunters, the extreme cold which seems to have affected much of the region at the end of Early Dorset caused polynyas to close, an event linked to the disappearance of Dorset from the High Arctic (Gronnøw and Sørensen 2006; Schledermann 1980).

In addition to faunal studies, which support the idea that Dorset were increasingly focused on the marine environment, are a number of ice-adapted technologies including ice crampons or creepers, whale-bone and ivory sled runners for small hand-drawn sledges, and snow knives for cutting snow blocks, as well as a profusion of

blubber-burning soapstone vessels. Other elements characteristic of Early Dorset are ground burin-like tools (accompanied by a decrease in spalled burins), ground adzes, longer and straighter microblades, bipointed needles with gouged eyelets, tip-fluted endblades, bifaces with multiple side-notches, rectangular soapstone vessels, and a wider variety of lithic raw materials, including various cherts, quartz crystal, and nephrite (Maxwell 1985:167–198). Many Early Dorset sites also contain a prolific ground-slate industry, including large numbers of bifaces, which Maxwell (1976:69, 1985:167–198) suggests were especially useful for separating blubber from underlying flesh. A variety of organic hunting technologies, including “cloven-hoof” lances and fish spears, are also known.

Continuing the typological work begun by Collins (1950) and Taylor (1968), Maxwell (1974–1975) identified five harpoon head types (Tyara Sliced, Tyara Pointed, Tanfield Sliced, Dorset Parallel Sliced, and Tunit Open Socket) that he believes demarcate the Early Dorset era, all but one with a characteristic triangular “slice” removed from an otherwise closed rectangular socket. However, as discussed below, Desrosiers et al. (2006) and Odess (2005) have pointed out serious flaws with this typology as it has been used to distinguish Early Dorset culturally and temporally from later populations.

Although there is limited evidence for magico-religious behavior during earlier periods, art pieces are more widely found during Early Dorset and presage the developed artistic tradition of later times (Sutherland 1997; Swinton 1967; Taylor 1967). Shamans teeth and tubes, as well as possible amulet boxes, have been recovered around Igloodlik (Maxwell 1985:Figure 7.10), Hudson Bay (Collins 1956, 1957), and Baffin Island (Maxwell 1973:222–223, 227, 231, Figures 56 and 60). Realistic carvings of animals, some with an incised skeletal motif, as well as humanlike figures, have been reported from Hudson Bay, Hudson Strait, and Baffin Island (e.g., Collins 1956, 1957; Taylor 1968:57–58). A fragmentary human mandible and three ribs were excavated from the Tyara site and may be associated with three ivory bear figurines and an ivory sheath or container found nearby (Taylor 1968:46, 79, 120, Figure 24 f–I). On Baffin Island, Maxwell (1985:177) inferred a seasonal proscription against sewing, while Mary-Rousselière (1976:43) suggested a caribou skull with symmetrically cut antler tines set into a dwelling’s wall may have played a ceremonial role.

Early Dorset domestic architecture is comparatively poorly known and there appears to be a high level of variability between reported structures, with both cold and warm season occupations identified (see Ryan 2012:Appendix 1). Surface and semisubterranean features are known, with footprints varying between circular and rectangular, while overall size suggests that at least some may have been multifamily structures occupied for substantial periods of time.

Early Dorset sites have a restricted distribution north of Lancaster Sound but are widely found in the Low Arctic, ranging from Victoria Island east to Labrador (Cox 1978; Fitzhugh 1972; McGhee 1971; Meldgaard 1960a, 1960b, 1962; Nagy 2000; Taylor 1967, 1968, 1972), and from Hudson Bay north to Ellesmere Island (Harp 1976; Helmer 1980; Mary-Rousselière 1976; Maxwell 1973, 1980; Schledermann 1978, 1990). Although Maxwell (1985:187) recorded that Early Dorset (Dorset I/Greenlandic Dorset) was

absent from Greenland, sites are now known from virtually all coastal areas (Grønnow and Sørensen 2006).

Middle Dorset

As with Early Dorset, the start and end dates of the Middle Dorset period vary by researcher and region. Maxwell (1985) suggests a range of 2300–1500 B.P., while others propose a comparatively late start of ca. 2000 B.P. (e.g., Cox 1978). There appears to be very little in the material culture or socioeconomic patterning of Middle Dorset to separate it from Early Dorset; Maxwell (1985:196–198; also Collins 1957) refers to this period as one of “stasis,” choosing to place the end of Early Dorset and beginning of Middle Dorset around 2300 B.P., based upon the supposed disappearance of the “sliced” harpoon head from Dorset assemblages.

What does distinguish the Middle Dorset period are massive demographic shifts which saw the near or complete abandonment of the High Arctic and Greenland (Grønnow and Sørensen 2006; McGhee 1976, 1981; Schledermann 1990) in tandem with a major population expansion south along coastal Labrador to Newfoundland (Fitzhugh 1980). Several researchers see these population changes as a response to a major cooling trend that accelerated after 2000 B.P., causing the primary and secondary High Arctic polynyas upon which those groups depended to close (e.g., Schledermann 1980). In comparison with Early Dorset, most Middle Dorset sites south of Lancaster Sound are smaller and were used for shorter periods (Maxwell 1985:198), and there are indications of increased regionalization and communication breakdowns as some areas were depopulated (e.g., Fitzhugh 1980, 1997:393; Odess 1998). It was during this period that Dorset came into contact with Amerindian populations (Renouf et al. 2000).

Middle Dorset culture in Newfoundland was originally perceived to be quite different from contemporary Dorset elsewhere in the eastern Arctic (e.g., Harp 1964), although it should be noted that much of this apparent distinctiveness resulted from unrecognized Groswater material in larger Dorset assemblages. Dorset in Newfoundland is best known from the west coast, particularly sites in the Port au Choix area, where occupation extended to ca. 1200 B.P. (Renouf 2011:133), well beyond the Middle Dorset period as defined elsewhere in the eastern Arctic. The longevity of the Dorset occupation in Newfoundland has been linked in part to the centuries-long reliability of a single resource, the harp seal, which Dorset on the island's west coast intensively exploited (Renouf 1993). However, rising temperatures after 1400 B.P. appear to have adversely effected the distribution of sea ice and the sympagic harp seal, causing Dorset groups to first broaden their economic base (e.g., Hodgetts et al. 2003) before eventually abandoning Newfoundland in what Renouf and Bell (2009:269) have termed a population collapse.

At the well-investigated Phillip's Garden site, many dwellings are large semisubterranean features occupied for extended periods of time; some may have had roofs framed with whale bone and several were probably multifamily structures (Renouf 2011). The relative permanency of the Phillip's Garden site, as well as its probable role as

a population aggregation location, is further indicated by the presence on or in its area of multiple human burials. Unlike the remainder of the eastern Arctic, where only a very small number of human remains from Early Paleoeskimo through Late Dorset are known (Helmer and Kennedy 1986; Koch et al. 1996; Lynnerup et al. 2003; Taylor 1968), sites in Newfoundland have yielded a comparatively large number of burials (see Brown 2011). Although Paleoeskimo mortuary behavior is still basically unknown, Brown (2011) has proposed that the method and relative abundance of burials in Newfoundland may be one indication of Dorset regionalism.

In general terms, there is little in the toolkit of Middle Dorset to separate it from Early Dorset, although there are trends suggesting a gradual evolution in the form of various tools such as the burin-like tool, which become more tabular during Middle Dorset. Endblades continue to be tip-fluted (although some also have serrated lateral edges and/or concave bases), a variety of symmetric side-notched bifaces were made, while rectangular and oval-shaped soapstone vessels were produced (Maxwell 1985:198–216). The abundant ground stone industry that emerged with Early Dorset declined significantly during Middle Dorset, and microblades also became less common (Harp 1964; Mary-Rousselière 1976; Maxwell 1985:198–216). Middle Dorset needles were given flattened or slightly rounded heads, composite antler boxes continued to be made, while “art” objects become even more widespread (Taçon 1983). McGhee (1971:163–165) suggests Middle Dorset may have been in contact with western Arctic Paleoeskimos on Victoria Island, where possible antler arrowheads were found at two sites, the only indication of bow technology in Dorset.

Middle Dorset is best documented in Newfoundland, but is also known from northern Labrador, both sides of Hudson Strait, northern Hudson Bay, northern Foxe Basin, and western Victoria Island (e.g., Collins 1957; Cox 1978; Fitzhugh 1972; McGhee 1971; Maxwell 1985; Meldgaard 1960a; Nagy 2000).

CONSIDERING THE CULTURE-HISTORICAL POSITION OF EARLY AND MIDDLE DORSET

Tyara (Taylor 1962, 1968), Tunermiut-1 (Collins 1956), Alarnerk, and Kapuivik (Meldgaard 1960a, 1960b, 1962) are “type sites” for Early Dorset, occupying a critical position in eastern Arctic archaeology because their assemblages form the basis for how Early Dorset has historically been defined. Changes in the form and frequency of select artifacts, typically harpoon heads, at these sites are assumed to have both chronological and cultural significance and have been employed in typologies that remain widely used to cross-date other sites (Collins 1950, 1956; Maxwell 1974–1975, 1985:86–87; Taylor 1968:51–53). This is despite the fact that the age estimates for the four key sites are of uncertain reliability: all were dated primarily with samples subject to the marine reservoir effect, a problem exacerbated by calibration problems linked to the Hallstatt

radiocarbon plateau (e.g., Becker and Kromer 1993). Where inconsistencies between typological and chronometric age estimates occur at other sites (e.g., Helmer 1991), the typological assessment, with all its inherent assumptions, has often been given priority.

Ramsden and Tuck (2001) were the first to seriously question archaeologists' reliance on Tyara (the only one of the four sites that is fully published) for building chronocultural frameworks. Although concurring with Taylor's conclusion of Pre-Dorset to Early Dorset continuity, Ramsden and Tuck (2001:9) have serious misgivings about Tyara, and Early Dorset, as a progenitor of later Dorset. Their concern centers on the presence in the collection of artifact forms that co-occur with Independence II/Groswater sites, a synchronicity indicating that "Tyara-type Early Dorset" should not be considered Dorset at all but instead seen as terminal Pre-Dorset (Ramsden and Tuck 2001:8). They further contend that there are striking technological changes between Tyara Early Dorset and Middle Dorset sites elsewhere, making Pre-Dorset through Dorset continuity unlikely in most areas, reopening the "problem" of Dorset origins (it should be noted, however, that their basis for attributing traits to either Early or Middle Dorset is unclear, as many listed attributes occur in both periods).

However, renewed research at Tyara has revealed that a lack of stratigraphic and temporal control at this site is likely responsible for the Pre-Dorset or transitional elements recovered by Taylor. Expanded excavation has permitted detailed analysis of site-formation processes and occupational sequences, while a suite of radiocarbon dates help to clarify Tyara's culture-historical position within the Early-Middle Dorset sequence (Desrosiers 2009; Desrosiers et al. 2006, 2008; Todisco et al. 2009). What becomes clear based upon this new work is that the site has a much more complex history than initially thought and includes a previously unrecognized Pre-Dorset level (as well as three discrete Dorset occupations) whose contents appear to have been inadvertently incorporated into the larger Dorset assemblage by Taylor. The Pre-Dorset flavor Ramsden and Tuck (2001) rightly identify in the Tyara assemblage is therefore not an indication of the site's Pre-Dorset nature, but instead appears to result from unintended mixing within a multicomponent site.

At the same time, the new series of radiocarbon dates obtained from the Tyara deposits call into question where the site, and all others typologically cross-dated to it, fit in the Dorset sequence. Unlike Taylor's sea-mammal dates, which indicate occupation near the beginning of the Dorset era (Taylor 1968), Desrosiers et al. (2008:765, Figure 5) obtained six charcoal measures which place the main Tyara Dorset occupation at 2100–1900 B.P., squarely in what is presently considered the Middle Dorset period. To confirm this chronometric placement, Desrosiers et al. (2006:139) conducted a comparative analysis of their assemblage with other extant collections, discovering there were no meaningful differences between Tyara and Middle Dorset in Nunavik. Based on these results, Desrosiers et al. (2006) contend that Early Dorset as currently defined is not present at Tyara and that the "sliced" harpoon heads used to identify Early Dorset are not a viable horizon marker for that period because they represent a Middle Dorset technology. This accords with Odess (1998, 2005), who previously questioned the value of sliced harpoons for defining Early Dorset, and also confirms Maxwell's (1976:61) own suspicion that sliced harpoons continued to be made after the close of Early Dorset.

The new work at Tyara shows that the reevaluation of classic sites, including those in the Foxe Basin (see Savelle et al. 2009; Savelle and Dyke 2014), is an absolutely necessary step if researchers are to make meaningful progress toward refining the eastern Arctic's current culture-historical framework and escape the longstanding impasse surrounding Dorset culture origins. Helmer's (1994) plea for researchers to rethink how the Paleoeskimo tradition is conceived has been joined by a new generation of researchers (e.g., Desrosiers 2009; Nagy 2000; Odess 2005) who would rather not rely on subjective and inconsistent criteria (Ramsden and Tuck 2001:10) when constructing cultural reference points.

In this vein, researchers must seriously begin to challenge the increasingly untenable eastern Arctic Paleoeskimo sequence, revisiting sites used to define the transitional and Early/Middle/Late Dorset periods so that they can "be incorporated into new ranges of data not as exception, but as a recognized and normal procedure for placing classic definitions in their historical context" (Desrosiers et al. 2006:140). Only after this, and following a serious measure of taxonomic introspection, can we begin to untangle the eastern Arctic's complex history of human occupation.

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CHAPTER 33

LATE DORSET

MARTIN APPELT, ERIC DAMKJAR,
AND T. MAX FRIESEN

INTRODUCTION

THE Late Dorset period is the final chapter in the 4,000-year story of a people who migrated out of Asia and into the Eastern North American Arctic over 5,000 years ago. It is the period which sees the first meeting of migrants from the west (Dorset) with migrants from the east (European Norse), thus representing the first time human communication had circled the globe.

Late Dorset spans the period between approximately 1500 and 700 B.P., though there are significant challenges to defining both the start and end of Late Dorset. This was a period of great change in the Eastern Arctic; climate change, population movements, immigration of new populations, and internal social forces ultimately led to the extinction of the archaeological culture known as Late Dorset. While the people may have disappeared, they left a distinctive and remarkable archaeological record, which speaks of the existence of small family groups through the cold and dark Arctic winters, but also of social and spiritual gatherings of considerable size and impressive organization, and an amazing record of artistic accomplishment that clearly held deep meaning for Dorset people.

Beginnings

The ultimate origins of Late Dorset lie in the Early Paleoeskimo populations that moved from northeast Asia through Alaska and into northern Canada and Greenland over 5,000 years ago (Friesen, this volume, chapter 28). However, of more immediate concern is the distinction between Late Dorset and the preceding Middle Dorset. There are a number of noteworthy differences in material culture, especially apparent in harpoon heads and stone endblades, however many Middle Dorset artefact forms, types of settlements, and adaptations continue into Late Dorset. The development from Middle to Late Dorset is still poorly understood, though current reanalyses of the Igloodik



FIGURE 33.1 Geographic extent of Late Dorset occupation.

Illustration by Martin Appelt

Paleoeskimo material collected by Meldgaard (1960) indicate that this transition likely began in the Foxe Basin area.

Arguably, the phenomenon that best distinguishes the Late Dorset period is the large-scale population movements, and perhaps local extinctions, that occurred around 1200–1100 B.P. Notable was the seemingly rapid spread of Late Dorset people from the densely occupied region around Foxe Basin and Hudson Strait into lands far to the north and west, which had been abandoned for hundreds of years (Figure 33.1). It is this large-scale spatial shift that most conveniently demarcates the start of the Late Dorset period, at least in the areas where this change is readily apparent. This period coincides with the Medieval Climate Anomaly, which saw warming in many areas of the North American Arctic. It seems likely that climatic effects on the abundance, predictability, or accessibility of important food resources played some role in the substantial redistribution of Dorset populations.

THE LATE DORSET ARCHAEOLOGICAL RECORD

During the eighth to tenth centuries A.D., Late Dorset people settled an enormous region stretching from Victoria Island in the west to northwestern Greenland in the

north to Labrador in the southeast. In many areas, circumstances have been kind to the Late Dorset archaeological record, and most Late Dorset sites are characterized by moderate to excellent preservation of bone, antler, ivory, and, occasionally, wood.

Late Dorset sites have often been subjected to little or no soil deposition. Sites sit fully exposed on relict beaches, like recently abandoned campsites. One can readily see the type and size of dwelling foundations, find evidence of specialized activities such as cooking areas, and judge whether they are short-term or intensively occupied sites. This high archaeological visibility contributes significantly to our understanding of Late Dorset.

Technology and Material Culture

Late Dorset technology is not substantially different from preceding Dorset periods (Figure 33.2). However, unlike the Thule Inuit who followed them, it does not appear that the Dorset made use of the bow and arrow, bow drill, or inflated drag float technology. Thus, we are left with an impression of a society with technological limitations compared with what we know from Inuit analogs.

Belying this image of technological impoverishment, the archaeological record leaves no doubt the Dorset were accomplished and skillful craftspeople and artisans with a sophisticated material culture. They were proficient flint knappers, producing end-blades for harpoons and lances, knife blades, partially polished burin-like tools (used for working antler, ivory, and bone), adzes, a variety of scrapers, and microblades. Chert was used most commonly for flaked stone tools, while chalcedony, nephrite, and slate were sometimes employed for partially or wholly ground tools. Larger microblades were made from chert, while smaller jewel-like microblades were produced from clear crystal quartz. Soapstone was used to make small cooking vessels and lamps. Both native copper and meteoric iron were used throughout most of the Late Dorset range, primarily in the form of blades for weapons and manufacturing tools.

Late Dorset harpoon heads, all of which are of the toggling variety, fall into several discrete types, implying specialized hunting applications. Two types, known as “Dorset Type G” and “Dorset Type E”, are especially abundant and can be considered diagnostic of Late Dorset—they were likely used to hunt ringed seals and walruses, respectively. Without elaborate drag float technology, Dorset hunters would often need to hold the line or otherwise secure it as the animal struggled. This implies certain limitations to Dorset hunting options—open-water hunting may have been difficult, and large bowhead whales were likely beyond their capabilities. Lances with stone points may have been used to hunt large land mammals like caribou and muskox. Barbed spear points were probably employed in fishing, possibly in conjunction with stone weirs. Large numbers of delicate bone needles are often recovered, indicative of sophisticated sewing methods; with tailored skin clothing being a critical technology for life in the Arctic. Although the clothing itself has not survived in the archaeological record, a few carvings of human subjects show the use of trousers, boots, and parkas with a distinctive three-sided high collar, rather than a hood. Many



FIGURE 33.2 Late Dorset artifacts. (a) lance point; (b) endblade; (c) copper endblade; (d) microblade; (e) transverse scraper; (f) endscraper; (g) knife; (h) ground burin-like-tool; (i) knife; (j–l) harpoon heads; (m) foreshaft; (n) two barbed spear points; (o) needle; (p) human figure; (q) miniature harpoon head; (r) seal figure; (s) king eider figure; (t) polar bear figure; (u–v) box parts; (w) human figure; (x) spatulate object; (y) human faces.

Image compiled by Eric Damkjar

stone tools were hafted in antler or driftwood handles, held in place with twisted sinew cord.

Late Dorset groups did not possess the sophisticated transport technology seen among later Inuit groups. Excavations at the Nunguvik site on northern Baffin Island produced several pieces of wood that appear to be ribs from kayak-like vessels, and there are small wooden objects possibly representing “toy” kayaks. However, there is

no evidence for larger boats capable of transporting groups of people or substantial gear (Mary-Rousselière 1979). Several Dorset sites have produced ivory and antler artifacts interpreted as sled shoes (Maxwell 1985:152–153), but not a single site has produced convincing evidence for the presence of domesticated dogs (Morey and Aaris-Sørensen 2002), implying that sleds were pulled by people.

While utilitarian items often display very fine craftsmanship, it is in the realm of “artistic” and symbolic expression that Late Dorset material culture really stands out. Miniature carvings of humans, polar bears, seals, walrus, birds, and other subjects occur in surprisingly large numbers, and are executed in fine detail, often with stylization and abstraction implying a deeper meaning than simple representation. Sometimes, carvings are executed with less skill or care but still with attention to detail; eyes, ears, nostrils, teats, joints, and other landmarks will be present on a carving despite a simplified overall form, suggesting mnemonic significance. This variability in skill level indicates that “art” pieces were created by many individuals, and not a particular category of artists (McGhee 1985; Sutherland 1997, 2001b). Nevertheless, a link with shamanic practices and spiritual relationships between humans and animals appears to be expressed in a number of carvings, including a remarkable example depicting transformation between a human and a polar bear (LeMoine et al. 1995). Similar skill and attention to detail are found in miniature representations of tools, most frequently harpoon heads (Park and Mousseau 2003). In some cases, these may be toys, though the fine execution and very small size of many seem intuitively inconsistent with what we might expect of a child’s toy. Dorset carvings are found in all types of sites and contexts, including refuse middens. The implication is that, while they may have had spiritual significance, they were part of everyday life, perhaps often carried around as amulets, an interpretation reinforced by the fact that they are often pierced for suspension. A unique, related phenomenon is the appearance of petroglyphs depicting human or human-like faces at soapstone outcrops in northern Nunavik (Arsenault et al. 2005). While these are not precisely dated, it is most likely that they were produced during the Late Dorset period. The apparent fluorescence of artistic expression in Late Dorset times is not fully understood, but has been suggested to be related to a warming climate, large-scale population shifts, and attendant “stress” (Taçon 1983).

Subsistence Economy

Seasonal changes in the Arctic are dramatic and fostered economic adjustments through the year, though some notable differences existed between regions. The wide distribution and predictability of ringed seals made them a primary resource, though Dorset technology may have been largely focused on ice-based hunting strategies. Animal bones associated with Late Dorset house depressions bear out this strong, though not exclusive, reliance on ringed seals in many regions. The larger bearded seal was also taken in winter, as was arctic fox, which also spends much of the winter on the sea ice. Where possible, fall and winter subsistence was likely supplemented with foods acquired during the warm season and stored for later use.

In the warm season, the Arctic offers a greater diversity of resources than is available in winter. Sea ice breaks up early in some places and lingers in others. Polynyas are places where currents and wind regimes produce patches of open water early in the spring or even year round. They have a very high biomass production and attract migratory sea mammals and waterfowl earlier and in greater numbers than more ice-bound areas. Wetlands serve as nesting grounds for huge populations of waterfowl. Rivers teem with anadromous Arctic char as they move between lakes and coastal waters. In places, substantial caribou migrations occur during the warm season, which may have engendered cooperative hunting strategies. Some areas are home to substantial walrus populations, which were hunted at suitable and favored haul-out locations. Other regions have regular migrations of harp seals. These warm-season resources are less evenly spread across the Arctic landscape than is the case for winter resources. In fact, warm season resources are, to some degree, clustered in places where favored conditions converge to form “Arctic oases,” where waterfowl, char, caribou, polynyas, or long-lasting sea ice may be found in close proximity. The importance of locations with abundant and/or diverse warm-season resources appears to be heightened in Late Dorset compared with earlier Dorset settlement, since Late Dorset aggregations occur with greater frequency in areas that could be characterized as Arctic oases.

Settlement Patterns

Most Late Dorset settlements are situated in coastal locations that were close to sea level at the time of occupation, reflecting the economic focus on marine resources, particularly seal and walrus. Inland areas were also utilized, depending on regional availability of critical resources such as caribou and waterfowl (Milne et al. 2012). In some areas, like northern Hudson Bay and Foxe Basin, walrus haul-out locations were important. In the Arctic Islands, polynyas appear to have been particularly attractive in spring and summer, because of the wide range and high density of waterfowl and marine mammals. Rivers with substantial seasonal char runs were important, as were the large caribou herds found on Victoria and Baffin Islands.

Thus, while Late Dorset settlements were widely scattered throughout the Eastern Arctic, local regions of concentration are apparent. One area of Late Dorset population concentration occurs in the Smith Sound region of northeastern Ellesmere Island and adjacent areas of Greenland where important polynyas occur. Another is found on southern Victoria Island where there are substantial runs of Arctic Char, and caribou migrate seasonally across the landscape (Howse 2008). Other islands of the Arctic Archipelago have smaller localized concentrations, but again they are often centered on attractive features like polynyas or wetlands with abundant waterfowl. Yet another area of concentrated Late Dorset settlement is in the Hudson Strait–Ungava Bay area. The caribou herds of northern Quebec and Baffin Island may partially explain the concentration of settlement here, but the lack of organic preservation at some sites, especially on Ungava Bay, presents a challenge to understanding their subsistence economy

and chronology. Finally, the Foxe Basin region contains some of the largest known Late Dorset sites, and thus must have held significant populations whose economies were based on walrus, seals, and other species (Murray 1999; Savelle et al. 2009).

Sites and Dwellings

One of the distinguishing features of Dorset Culture is the appearance of larger and more substantial dwellings than are generally seen in earlier Paleoeskimo cultures (Figure 33.3). These rectangular house ruins, typically 3 to 5 m on a side, are excavated as much as 50 cm into the gravel beach, and have gravel or sod berms around their perimeters which likely



FIGURE 33.3 Late Dorset structures. Top left: Somerset Island longhouse. Top right: Cape Faraday, Ellesmere Island, longhouse. Middle: two views of hearth row associated with longhouse. Bottom: artist's conception of semisubterranean house without and with skin cover.

Image compiled by Eric Damkjar

represent the remains of heavy sod walls. Houses may be associated with significant midden accumulations of animal bones and other debris, giving a clear impression of some permanency and/or repeated use. Their semisubterranean form and associated animal bones indicate these were cold-season dwellings. Late Dorset semisubterranean dwellings often occur in groups of two or three structures, but they can also be found in much larger groupings of a dozen or more, giving the impression of a "village." Of course, caution must be exercised in interpreting these as large gatherings rather than as repeated use of a locale by small groups, but it seems likely that local circumstances sometimes gave rise to fairly large winter settlements.

The interiors of Dorset semisubterranean dwellings vary considerably. What seems quite consistent, though, is the presence of an axial feature running from the entrance to the back of the dwelling with presumed living spaces on one or both sides. Sometimes, the mid-passage is paved with rock slabs or defined by boulders, while in other cases it is much more ephemeral. Some Dorset semisubterranean houses are larger than others and appear to have housed at least two families. Dorset had snow knives and oil lamps, probable prerequisites for extended stays on the sea ice, and it is extremely likely that in some regions Late Dorset people occupied snow houses on the sea ice for at least part of each winter.

In contrast to the distinctive winter-house depressions, warm-season occupations show greater variability. They can be small scatters of boulders, flagstone platforms, and isolated hearths, often with no clear evidence of a tent ring, giving the impression of a short-term, makeshift camp; a view supported by the paucity of artifacts and faunal remains at such sites (e.g., Schledermann 1990:267). Such sites can be found at very low elevations, suggesting they were situated close to the water. At the other end of the spectrum we find heavy axial features defined by stone slabs, with well-defined platform areas often demarked by layers of moss or twigs, which may be surrounded by what was once a low wall of sod. In contrast to the cold-season dwellings, this last-mentioned type is not semisubterranean. Some of the differences seen among the warm-season dwellings likely reflect differences in the season or duration of their use.

Longhouses

A distinctive type of structure, most often referred to as a Dorset "longhouse," has come to be recognized as one of the hallmarks of Late Dorset culture. Dorset longhouses are typically rectangular in shape, 5–6 m wide, and between about 12 and 45 m in length. Some have peripheries of sod, gravel, and/or rock associated with shallowly excavated interiors. Others with walls of boulders are unexcavated, or have only partially excavated interiors. Interior appearance is variable, but an axial organization of space is sometimes evident. Sometimes there is an elaborate arrangement of small stone slab boxes or platforms dispersed along the central axis. In other cases, the interior seems in disarray, with rocks and slabs scattered about with no obvious axial concentrations. However, even in these latter cases, the distribution of cultural material within the

longhouse sometimes reveals an axial use of space. Internal stone arrangements suggest the majority of longhouses were roofed with either separate or conjoining tents within the longhouse enclosure.

Unfortunately, few longhouses have been dated, or they have only one or two radio-carbon dates. Nevertheless, existing dates indicate that longhouses were constructed and used during the entire Late Dorset period (Damkjar 2000). Some longhouse sites may have been used through several centuries (Appelt and Gulløv 1999; Friesen 2004; Plumet 1985), leading to the possibility that the nature of their use varied over time. Longhouses have been reported over almost the entire Late Dorset range, with the exception of regions in and around Foxe Basin.

Most known longhouse sites contain many additional stone features, including caches and hearths. Particularly distinctive are rows of stone features, thought to be hearths, located outside, but in association with, the longhouses. These hearth rows vary in length and number of units in direct proportion to the length of the associated longhouse, suggesting that longhouse settlements represent communal gatherings of up to 24 families (Damkjar 2000). There is often more than one hearth row at a site and the features often occur as paired sets of larger and smaller units.

Archaeological assemblages associated with longhouses are not unlike those found at other Late Dorset sites, containing a typical range of refuse, suggesting that people actually lived here and went about their normal domestic activities (Damkjar 2005). One feature of longhouse artifact assemblages deserves particular attention—harpoon heads are invariably overrepresented, as a percentage of all bone, antler, and ivory artifacts, compared with other types of sites. This does not seem to be related to the intensity of sea-mammal hunting—quite the reverse. Ringed seals, a Dorset mainstay, may not have been as readily hunted during late summer when open water would have been pervasive during the Medieval Climate Anomaly. This may have been an opportunity to repair and renew seal hunting equipment. The fact that complete harpoon heads are quite common at longhouse sites suggests that old harpoon heads were discarded for reasons other than their physical condition.

Longhouses appear to involve the coming together of multiple families at predetermined locations, often in relatively large aggregations. There is good reason to think that economic motivations were important to many longhouse gatherings. Longhouse sites are clustered in areas of significant resource abundance, and being part of a large cohesive and egalitarian group would have ensured members equal access to resources in that area (Damkjar 1990, 2010). Indeed, coordinated collective foraging activities would reduce resource risk and make certain resources more effectively and efficiently exploited (e.g., fish, waterfowl, and perhaps caribou). Such a group would also have the numbers to control a resource area against intrusions by competing groups, with longhouses and hearth rows potentially making a visual statement of claim to a certain area.

A second set of interpretations emphasizes the ritual and social aspects of these structures (Friesen 2007; Gulløv and Appelt 2001; Park 2003; Schledermann 1990). Most researchers consider all of these structures to have originally been constructed as communal dwellings, and assume that they all saw similar ritual, social, and economic

activities, not all of which left easily interpretable traces. However, there is unmistakable variability over space and time, and one structure at the David Site in northwest Greenland seems to have had a particular emphasis on ritual practices; it has been termed by Appelt (1999) an “Arctic megalith structure.” Since these gatherings presumably involved the coming together of people otherwise separated during much of the year, longhouse aggregations would have provided an opportunity to share information and stories, make plans, renew social relationships, and participate in ceremonies and rituals considered important to the wellbeing of the group. In addition, the repeated patterning seen in Dorset longhouse sites, usually with one communal habitation structure and associated rows of identical hearths, suggests an important role for prescribed behavior and decision making, within the context of an egalitarian ethos.

SOCIAL ORGANIZATION

Gender and Childhood

Attempts to understand Dorset social organization are in their infancy, at least in part because large-scale excavations of individual sites are rare. However, in most regions small groups composed of one to a few families probably characterized life for much of the year, with occasional much larger aggregations. There is reason to believe that some areas, such as Foxe Basin, may have seen larger and more stable populations during at least part of the Late Dorset period, leading to speculation that egalitarian social relations may not always have been in place (Friesen 2007; Murray 1999).

The Late Dorset archaeological record contains several data classes which can be used to interpret gendered and age-related social phenomena. For example, while the Middle and Late Dorset archaeological record contains over 1,000 miniature carvings, including large numbers of human figures (Lyon 1982; Sutherland 1997; Taçon 1983), only a handful reveal the gender of the depicted person or creature. This is in contrast to later Inuit figurines, probably reflecting the fact that traditional Inuit societies were generally organized with distinct and complementary gender divisions. Differences between Dorset and Inuit figurines may result from different functions of figurines within society. Alternatively, they might reflect a difference in the Dorset perception of the relationship between men and women, perhaps with less differentiation of gender roles in some aspects of society than occurred among Inuit. The layout of some Late Dorset dwelling features may indicate different organization of workspace inside the household in comparison to that seen amongst many traditional Inuit societies (LeMoine 2003), which may have had some significance for the gendered organization of labor.

Archaeological remains from most Dorset sites with good organic preservation include a number of miniature artifacts, such as soapstone lamps, harpoon heads, boat pieces, and others, some of which are likely to be children's toys. None of the categories seems to be exclusively made for children, and it has been suggested that they cannot

be considered toys *per se*, but rather functional tools scaled to the sizes of children at various ages (Park and Mousseau 2003). This may mean that children were perceived as individuals, and small versions of grown-ups, not unlike their position among some historical Inuit societies (Hardenberg 2010).

Interaction and Exchange

Far-reaching interaction networks are evident within and between regions settled by Late Dorset communities. An indirect indication of the intensity of communication is provided by analyses of “art” pieces that have been recovered from across the entire Dorset settlement area. Some regional “styles” can be identified in the Middle Dorset period, but regional styles disappear in Late Dorset, indicating that more regular contact occurred between regions (Lyon 1982; Taçon 1983). This is seen most emphatically in ivory tubes from widely separated locations across the Canadian Arctic, which share almost identical imagery combining aspects of walrus, seal, and human (LeMoine et al. 1995). More immediately recognizable evidence of these interaction networks is seen in the distribution of “exotic” raw materials, including iron, copper, and various stone raw materials. Their wide distribution highlights their importance, and it is likely that their value was based in large part on their aesthetic and exotic properties.

Iron was obtained by Late Dorset people from eight meteorite fragments in northwest Greenland. This iron has a distinct trace element profile (Buchwald 1992), allowing us to suggest that it was not found and used until Late Dorset groups arrived in Northwest Greenland. The meteoric iron from Northwest Greenland has been found across much of the Late Dorset range, from Smith Sound (Appelt et al. 1998; Schledermann 1990) and Axel Heiberg Island (McGhee 1984:5) in the High Arctic, to Devon Island (McGhee 1981), Little Cornwallis Island (LeMoine 2005), Somerset Island (Damkjar 2005), and the Igloodik area.

The distribution of native copper is generally similar to that of meteoric iron but includes sites on Victoria Island, at the westernmost fringe of the Late Dorset area, reflecting the presence of major copper sources in the Coronation Gulf region (Franklin et al. 1981). The finds from the Late Dorset period in the Iqaluktuuq region on Victoria Island include 13 pieces of copper, and it is found on a variety of additional sites as far away as northwest Greenland (Appelt et al. 1998). With the exception of the Arvik and Tasiarulik sites at Little Cornwallis Island, which produced 53 pieces of copper (LeMoine 2005), the limited amount of copper and iron is noteworthy. This pattern likely results from both the limited use of metal detectors (with the exception of the Little Cornwallis sites) and the fact that metal objects would have been curated, and reworked into very small pieces prior to discard.

In addition to trade in iron and copper, no doubt there were a multitude of smaller-scale exchange systems within regions and between neighboring regions that may have included materials such as antler (LeMoine 2005), quartz crystal (Damkjar 2005), ivory, wood, soapstone, and rarely preserved materials such as skin, fur, and blubber.

LATE DORSET COSMOLOGY

Animism and Shamanism

Various aspects of Paleoeskimo cosmology become highly visible during the Late Dorset period, and are best understood within the framework of animism. Animism as a scientific construct has been heavily debated (Ingold 2000), but according to the view that we follow, the animistic world view among the native people of northern Siberia and the Inuit Arctic described a situation in which everything has an inherent energy, and humans and nonhuman beings are connected and have social relations with, and other influences on, one another (Pedersen 2001). The world is forever being created (reborn) through the interactions between all kinds of beings (Ingold 2000). The inherent energy of nonhumans is related to their shape and place in the landscape, and some, including humans and animals, have an energy that is somewhat similar to the western concept of “soul” (Pedersen 2001:414–416). The complex relations amongst humans and nonhumans are handled through a number of ritualized practices that collectively are described as shamanism. In the present Late Dorset context we do indeed see some similarities to historical arctic shamanism, especially as practiced in Siberia (e.g., Sutherland 2001).

Human Burials?

One remarkable aspect of the Paleoeskimo period as a whole is the rarity of human remains. Late Dorset graves or grave-like features have been reported from the Alarnerk site, Northern Foxe Basin, including 16 stone chambers and 12 pits, none of which have produced human remains (Lynnerup et al. 2003). Five gravel mounds were found in proximity to the “pit graves”. One mound (A17-02) covered a pit structure lined with 11 caribou scapulas with no additional artifacts or human remains. The second mound (A17-01) included at least three activity areas or floors. The mandible of a child was found in the mound, but indications are that the ritual activities were primarily centered on the carefully arranged walrus remains found in the same feature (Odgaard 2012). In addition to the child’s mandible found inside the mound, the Alarnerk site produced one human bone from a Late Dorset midden.

The limited number of specimens as well as their deposition in middens suggest that the bodies of deceased humans may have been “buried” in the sea directly or on the sea ice, or left unprotected on land (McGhee 1996). The deposition of individual human bones in middens and the buried human mandible in the Alarnerk mound, as well as the inclusion of grave goods, may however indicate that at certain times and places burial practices were substantially more complex.

Ritually Deposited Animal Remains

The impression that some nonhuman “beings” were situated in a complex ritual role in relation to humans is reinforced by a number of findings from inside Dorset houses. The Late Dorset House 1 at Qeqertaaraq in northwest Greenland included pit features with crania of arctic fox and arctic hare. Both species made up significant percentages of the faunal assemblage (Bendix 2000), and were likely taken for both their skin and meat. It is, however, striking that whole crania dominated inside the house, most of which were deposited in pits. The excavated material from House 1 at Qeqertaaraq further included two polar bear mandibles deposited in the back of the house. These mandibles constitute the only cranial elements of polar bear found among the more than 6,500 bones from the house and its midden (Bendix 2000). At the Snowdrift Village site on Dundas Island, polar bear crania and forelimbs had been placed outside the midden areas (McGhee 1974–1975:143, 1981; Maxwell 1985), and one of the crania had been sprinkled with ocher (Sutherland 2001a:15).

Humans and Bears

One of the shared elements of circumpolar shamanism is the special relationship between humans and bears (e.g., Hallowell 1926; Larsen 1969–1970; Sutherland 2001a). In an Inuit context this relationship is based on polar bears’ likeness to humans. The bear is able to cross the border between sea and land and, like humans, is both predator and prey, and has the ability to exchange shape with the shaman (Appelt 2004). The polar bear can be considered a liminal animal in an unstable position “in between,” like the status of a shaman in between the “normal” and the “spirit” worlds (Grandorf 2005:102).

Amongst Dorset “art pieces,” human and bears constitute the dominant categories, together comprising about 35 percent of the 920 specimens analyzed by Taçon (1983). The style of depiction of the two groups ranges from fully naturalistic to abstract, and from full-figure portrayal to partial representations in which, for example, five dots or short lines can stand in for humans and bears, respectively (e.g., McGhee 1985). While some figures seem almost playful in their expression, many seem rather unsettling and are often interpreted as relating to themes such as death, rebirth, transformation, “harmful magic,” sex, and fertility (e.g., Appelt 2004; Betts et al. 2015; Taylor and Swinton 1967).

The bear, like other animals, is often shown with an X-ray skeleton motif featuring the spine (which may represent the lifeline) and “+” marks at the joints. One famous example from Igloodik contained red ocher in a small compartment in its neck, which had been covered by a sliver of wood (Meldgaard 1998). Exclusive to human figures, bear figures, anthropomorphic harpoon heads, and in a few cases walrus carvings, are x-shaped incisions on the heads. Harpoon heads with those characteristics are found mainly on sites with longhouses (Schledermann 1996:97). It has been suggested that the “x” marks are a specific reference to the shaman and his travels to the over- and under-worlds (Lyon 1982:102–103), and a Late Dorset bear/shaman transformation figure from

Little Cornwallis Island further implies a strong association between shaman and bear (LeMoine et al. 1995). Also, a number of Dorset sites have produced bear dentition carvings made from walrus ivory that were likely placed directly in the mouth of the shaman assuming the form of either a polar bear or a polar bear helping-spirit (Taçon 1983).

A final indication of the symbolic importance of the polar bear is seen in longhouses. In the vicinity of the main entrance of the longhouse at the David site in Greenland, two polar bear canines were found, still in situ in chopped mandible sections. One was placed on each side of the axial feature. In two longhouses from Somerset Island, bear mandible/maxilla sections have also been found (Damkjar 2005), and a fourth example is seen at the Cadfael site on Victoria Island, where one longhouse had a bear mandible placed near the main entrance next to the side wall. These finds may provide an entry point to one of the ideological concepts needed to understand some or all of the longhouses, namely that they represented an architectural abstraction of the polar bear (Plumet 1985).

Axial Features and Cosmology

From earliest Paleoeskimo times to the Late Dorset period, the “axial feature” (also known as a “mid-passage”) forms a central architectural principle which must have had cosmological significance. Most formal Late Dorset dwellings are rectangular to oval in ground plan. They may be either summer dwellings with walls marked by the boulders that would have secured the tent cover to the ground (tent rings) or cold-season dwellings with sod walls (often semisubterranean). The internal arrangement is often divided in three by an axial feature; this axial pattern is also seen in the layout of some longhouses.

On the basis of phenomenological analyses of Paleoeskimo structures and their counterparts in the historical record from northern Scandinavia and Siberia, Odgaard (2001, 2011) concludes that the axial feature may represent a concrete architectural image of a constant circle of birth, death, and rebirth. LeMoine (2003) has suggested an additional layer of meaning in which the house was a conceptualized animal and the axial feature the lifeline (breath) of the animal. The dwelling as a conceptualized animal is known historically from Alaskan Inuit societies, where it represents the inside of a whale (e.g., Patton and Savelle 2006). Thus, there seems to be a distinct conceptual link between the architecture of Late Dorset dwellings, hearth rows, and longhouses; this link is seen in the fact that the David site structure may have originally been a hearth row which was later transformed into a longhouse (Appelt and Gulløv 1999). The connection between these architectural elements is likely centered on the cosmological concept of the axial feature representing both the connection between the various worlds and the lifeline of the animal. As outlined earlier, in the case of at least four longhouses, there is reason to believe that this animal is the polar bear, and it seems at least possible that *all* longhouses symbolized polar bears, with one end symbolizing the mouth of the animal. In fact, Appelt (2004) has suggested that when people entered the David site longhouse’s axial feature, they may have been symbolically entering the bear’s digestive system.

ENCOUNTERS AND DISAPPEARANCE

The end of Dorset is intimately intertwined with interactions with two “other” peoples: Norse settlers of Greenland and newly arrived Thule Inuit. The nature and timing of these interactions are the most hotly debated areas in Late Dorset archaeology.

Dorset and Norse

At the outset, we must state that interaction of some sort between Late Dorset and Greenland Norse is not unexpected, given the overlap of the two societies in adjacent territories for at least 300 years. Much of the evidence, however, is surprisingly unclear. The debate involves not only archaeological data, but also interpretation of the sparse Norse written sources, of which some were created several centuries after the events they describe. Hans Christian Gulløv (this volume, chapter 38) has suggested that trade between Late Dorset and Norse may have paved the way for later trade between Thule Inuit and Norse in the thirteenth century A.D.

The oldest written European reference to North America is from about 1075, while the earliest extensive accounts are the so-called *Greenlander's Saga* and *Erik the Red's Saga*, which were probably written in the thirteenth century, but refer to events that took place in the earliest parts of the eleventh century. These saga texts relate stories about the initial discovery of land west of Greenland, and about two short-lived attempts at Norse settlement in the new lands that were cut short by conflicts with native North American groups, which can most likely be identified as Amerindian (Odess et al. 2000).

In the early 1960s, a Norse site was discovered at L'Anse aux Meadows on the northern tip of Newfoundland (Wallace 2000), validating the Norse accounts of travel to Vinland. Excavations at L'Anse aux Meadows yielded a Dorset soapstone lamp, which suggested the possibility of contacts between Norse and Dorset. A second piece of evidence was unearthed at a site on southeastern Hudson Bay, where a Late Dorset house produced a smelted copper pendant of likely Norse origin (Harp 1974–1975).

In the late 1990s, Patricia Sutherland (2002) rediscovered a three-meter-long piece of cordage spun from hair of arctic hare in previously excavated collections from the Nunguvik Site on northern Baffin Island. The technique and materials used for making the cordage are comparable to samples found on Norse sites in Greenland. In addition, various pieces of wood from the Nunguvik assemblage were reported to have been worked by techniques that were unusual in a Dorset context, and to be made of wood species that are rarely seen as driftwood in the area. These findings led to reevaluation of similar pieces of cordage and worked wood from other Dorset sites on Baffin Island and in northern Labrador, and also of other data classes. For example, some carvings of human faces with long and narrow noses, marked eyebrows, and what seem to be beards were suggested to portray Norsemen (Sutherland 2000). Excavations at the Nanook and Tanfield sites (two of the sites from which cordage had previously been found) produced further evidence to

support a possible Norse presence on the shores of Hudson Strait. This includes a section of a coursed stone wall and a stone drainage trench that have parallels on Norse sites in Greenland. The faunal material from Nanook and Tanfield apparently includes hairs of dog, rat, and possible horse mane, all of which would have a European origin (Sutherland 2009). The results led Sutherland to suggest more than sporadic contacts between Norse and Dorset in the Baffin Island, Hudson Strait, and northern Labrador regions.

Considering this range of possible indicators of Norse presence in Arctic Canada, combined with a landscape thinly peopled by Late Dorset groups who were accustomed to trade and who had access to materials such as walrus ivory, which would have been of value to Norse, some level of contact between the two is highly plausible. However, there are a number of issues which need to be addressed before we can judge the intensity and nature of any contacts which may have occurred. As pointed out by Sutherland (2000; 2009), chief among these issues is the discrepancy between the majority of radiocarbon dates, which place the sites in the sixth to eighth centuries A.D., and the earliest known Norse presence in Greenland dating to the late tenth century. Sutherland sees three possible explanations for the discrepancy: (1) a previously undocumented sixth- to eighth-century European presence in the area; (2) contamination of the radiocarbon samples; and (3) site contexts that have been disturbed by complex human and natural formation processes. Sutherland's arguments have been challenged on several grounds, with questions raised about the above-mentioned difficulties in dating the sites, some of the results of the analyses performed on the cordage, whether the plying and spinning techniques seen in the production of the cordage is in fact Norse in origin, whether the driftwood species used on these sites should actually be considered unusual in the waters around the areas in question, and whether the woodworking techniques observed on these sites were actually beyond the technological capabilities of Late Dorset people (e.g., Alix, this volume, chapter 4; Fitzhugh et al. 2006; Park 2008).

Dorset and Inuit

Inuit oral traditions relate stories about meetings with another people called Tuniit (e.g., Rasmussen 1921–1925; Bennett and Rowley 2004). Tuniit have been variously identified as Norsemen, Subarctic First Nations, and people of the Dorset culture, reflecting shifting European understanding of early Inuit history in the eastern Arctic (Kleivan 1996). Interest in the identity of the Tuniit rose in the 1950s when archaeological and ethnographic fieldwork in the Igloodik area suggested both geographical and chronological overlap between the earliest Inuit and latest Dorset presence. In addition, local Inuit informants related a number of hitherto unrecorded stories about Tuniit, and pointed to specific Late Dorset house ruins as having been constructed by Tuniit (Mary-Rousselière 1955; Meldgaard 1955).

Thus, the timing and nature of interaction between Late Dorset and Thule Inuit has emerged as one of the more contentious areas in Arctic archaeology (Park, this volume, chapter 34). Debate has focused on the validity of various radiocarbon dates, and on whether particular artifact types and technologies have been transferred, directly or indirectly, from one group to the other (Park 1993, 2000). Robert Park ultimately concluded that most

artifactual evidence hitherto presented as evidence of direct interaction was actually the result of Thule groups settling in abandoned Dorset dwellings and/or salvaging Dorset artifacts, and he questioned all Late Dorset radiocarbon dates falling after roughly 800–900 cal A.D. A large part of the argument revolves around the rejection of “problematic” radiocarbon dates; however it is not always clear that the rejection of each date is justified. Furthermore, in the process of reevaluating regional sequences, limited attention has been given to whether or not the samples are derived from components with strong stratigraphic control.

Multiyear investigations in the Iqaluktuuq region on southeastern Victoria Island have yielded a series of dates from carefully controlled contexts that document substantial Late Dorset settlement in the area well into the thirteenth century cal A.D. (Friesen 2004, 2007). More limited settlement of Late Dorset groups into the thirteenth century has been documented in a range of other contexts across a broad area from western Victoria Island to the Boothia Peninsula (Savelle et al. 2012, and references therein). In addition, radiocarbon dates from the northernmost Late Dorset occupations on eastern Ellesmere Island and in the Thule District of Greenland have strongly indicated Late Dorset use of the area from the early part of the eighth century to the early fourteenth century (Appelt 2003; Darwent and Foin 2010; Gulløv and McGhee 2006; Schledermann 1990). Radiocarbon dates from Little Cornwallis and Somerset Islands in the central Canadian Arctic also suggest Late Dorset presence until the middle of the thirteenth century (Damkjar 2005). Some of the dates from the Labrador and Ungava regions are more difficult to interpret (Damkjar 2000; Park 1993), but probably document Late Dorset presence in areas south of Hudson Strait at least into the thirteenth century A.D. (Damkjar 2000; Fitzhugh 1994; Plumet 1985).

With regards to the timing of the Thule peoples’ arrival in various parts of the eastern Arctic, there is less agreement. A number of authors consider a thirteenth-century arrival most likely (e.g., Friesen and Arnold 2008; McGhee 2000), while others point to earlier, if “problematic,” dates, which would place the Thule arrival at least a century earlier (Appelt 2003; Gulløv and McGhee 2006). All, however, probably agree that the more continuous dating sequences for Thule begin in the thirteenth century. Depending on which Thule “arrival date” one accepts, the chronological overlap between Late Dorset and Thule varies from as much as 300 years to as little as 100 years or less. During the fourteenth century, the Paleoeskimo tradition came to an end in the entire Arctic.

The meetings between various Late Dorset and Thule groups are likely to have followed diverse paths in different geographical areas and across time—ranging from open hostility to situational collaborations. Inuit oral history recorded in the nineteenth and twentieth centuries relating to encounters that took place some 600 years earlier generally suggests that the first meetings between the two ethnic groups included positive interactions. In a second phase, social tension and open hostility between the groups seem to have developed, eventually leading to the disappearance of the Dorset groups (e.g., Bennett and Rowley 2004; Mary-Rousselière 1955; Meldgaard 1955; Rasmussen 1921–1925). The overall image emerging from the archaeological record does, however, seem to be characterized by a pattern of avoidance (Appelt and Gulløv 1999; Fitzhugh 1994) between parties of dissimilar social and economic organization (Friesen 2000). Direct artifactual evidence of interaction is present but rare in the archaeological record; most often evidence is indirect

and becomes visible only by including several complex lines of arguments (Appelt and Gulløv 1999, 2009; Gulløv 1996; Gulløv and Appelt 2001; McGhee 1997).

CONCLUSION

Our ambition in this chapter was to provide a broad overview of the Late Dorset archaeological record, and we have thus deliberately glossed over variability. For example, differences are seen in the zooarchaeological assemblages excavated at different sites, but these seem to reflect differences in zoogeography, and not differences in social organization or hunting methods. The high degree of similarity between Late Dorset regional groups is the result of complex social, economic, and ideological processes, which were promoted by relatively intense interregional interaction. The exchange of raw materials and objects likely formed the basis for these interaction networks, which not only ensured interregional access to unevenly distributed resources, but probably also functioned as a medium through which crucial social ties were established and maintained. The exchange we do recognize is likely to be but a faint reflection of substantial networks connecting people across vast distances.

According to a prominent interpretive model, the Dorset world was centered on a “core area” in Foxe Basin, Hudson Strait, and environs, which has been characterized as particularly rich in resources and thus capable of supporting a large, stable human population (e.g., Maxwell 1976, where the concept was first introduced). Areas outside of this core area have been considered peripheral. While the model seems to have strong explanatory power, it is problematic for several reasons (Fitzhugh 2002; Odess 2002). For example, during many periods of Paleoeskimo prehistory including the Late Dorset, several regions outside the core area seem to have held substantial and stable populations. We would suggest that a more relevant and flexible analytical model would view the Late Dorset world as a number of nested social, economic, and ideological networks functioning at a variety of scales across cultural landscapes anchored in ecological and geological space. The importance, intensity, and interconnectedness of these networks fluctuated over time, with particular focal places and regions emphasized at different times. These fluctuations could result from external factors such as climate change and interactions with Norse or Inuit, or internal forces such as social or ideological changes within Late Dorset regional groups. The further study of these large-scale networks, and their intersection with more local processes, will define the next phase of Late Dorset research.

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CHAPTER 34

THE DORSET-THULE TRANSITION

ROBERT W. PARK

INTRODUCTION

As outlined elsewhere in this volume, the eastern Arctic (essentially Arctic Canada and Greenland) was initially populated by Paleoeskimo immigrants from the region around Bering Strait approximately 4,500 years ago. In the eastern Arctic these original occupants and their descendants are recognized archaeologically by culture names such as Independence I, Pre-Dorset, and Saqqaq. By approximately 2,700 years ago, the descendants of these earliest Paleoeskimo populations in these regions had developed a way of life and technology that was sufficiently transformed that archaeologists give them a new name: Dorset. Sites of the Dorset culture are found from Victoria Island in the west to Greenland in the northeast and to Newfoundland in the southeast. During the centuries when Dorset flourished in the Eastern Arctic, cultural developments amongst the peoples living on the Siberian and Alaskan sides of the Bering Strait eventually led to the emergence of the Thule culture. Sometime between 1,000 and 800 years ago small groups of Thule pioneers moved eastward from Alaska into the eastern Arctic, soon expanding throughout that entire region.

At issue in this chapter is what, or more precisely whom, the Thule encountered during their expansion into the eastern Arctic. Did they encounter people of the Dorset culture and, if so, what was the nature of the encounters between them? Alternatively, did the Thule enter a virtually uninhabited region due to the Dorset having suffered a population collapse sometime in the centuries prior to the Thule arrival? Until relatively recently the answer to these questions seemed quite clear: the Thule did encounter and interact in various ways with the Dorset. In the early 1980s, Moreau Maxwell outlined a widely acceptable scenario for the nature of such interactions:

Dorset people may have dwindled in numbers as the better caribou crossings and fish weirs were taken over by bow and arrow-equipped Thule people, able to operate

in larger social groups by virtue of the quantities of whale meat that supported their communities. Dorset people and culture may have been pushed to peripheral, less desirable regions, or the majority of Dorset people may simply have substituted Thule culture for their own. In all probability a complex combination of these events took place. (Maxwell 1984:368)

At the same time, however, Maxwell himself and William E. Taylor Jr. were aware of the absence of robust archaeological evidence for these kinds of interactions. Taylor (1979:v) identified the Dorset-Thule succession as a problem for Arctic archaeologists and suggested that the apparent scarcity of evidence for contact between the groups might in itself be significant. Maxwell (1983:85) wrote that he was “beginning to think it is possible that if the Thule expansion were no earlier than the closing phase of the Mediaeval Warm Period the majority of the Dorset population outside of the Labrador and Quebec coasts could have suffered a catastrophic collapse a century or two earlier and that Thule immigrants found a virtually uninhabited land.” Elsewhere he wrote, “Carbon dates, even treated with deserved skepticism, only rarely indicate overlap of the two cultures in the same locale; hypotheses about borrowed traits remain mainly inferential; and in spite of the subsequent excavation of many Late Dorset and Early Thule sites, there is not yet empirical evidence of contact” (Maxwell 1985:240).

Despite a renewal of interest in this question starting in the 1990s, resulting in at least a dozen publications focusing on this topic (Fitzhugh 1994; Friesen 2000, 2004; Gulløv 1996; Hayes et al. 2005; McGhee 1997, 2009b; Park 1993, 1998, 2000; Shields and Jones 1998), the problems identified by Taylor and Maxwell remain relevant. The rest of this chapter attempts to summarize the current state of knowledge concerning this interesting question, reviewing the data that have been brought to bear on the problem and briefly outlining the scenarios that are currently being offered to model the transition.

THE EVIDENCE

For scholars investigating this issue, five categories of data seem to be most relevant to the question of whether contact could or did take place: (1) radiocarbon dates from the two cultures; (2) culturally diagnostic artifacts found in contexts suggestive of direct contact; (3) artifacts exhibiting stylistic or technological features inferred to have been transmitted between the cultures via acculturation; (4) genetic data; and (5) the distribution of Late Dorset and Thule sites.

Radiocarbon Chronology

If the basic questions concerning the Dorset-Thule succession are whether the Dorset were still extant at the time the Thule arrived in the eastern Arctic or whether they had

suffered a widespread population collapse sometime in the centuries prior to the Thule arrival, then radiocarbon dating becomes especially crucial in determining which model is more plausible. Because one of the scenarios proposed by several researchers involves the Dorset actively avoiding contact with the Thule (see below), radiocarbon dates showing that the two cultures were contemporaries in the eastern Arctic might represent one of the few categories of evidence of a pattern of contact characterized by avoidance. Therefore, overlapping radiocarbon dates from Dorset and Thule sites continue to form the cornerstone of current arguments supporting the position that the Dorset were still present in much of their territory when the Thule arrived from the West (e.g., Appelt et al. 1998; Fitzhugh 1994:241; Friesen 2004:685; McGhee 2000:183). Friesen (2004:686), for example, argues that radiocarbon dates from sites on Victoria Island “indicate that Late Dorset people survived until at least the end of the twelfth century A.D. and probably later on Victoria Island, in the southern Canadian Arctic Archipelago, and that for at least a century they lived in relatively close proximity to early Thule people.”

As noted above, back in the early 1980s, Maxwell (1983:85) was contemplating the possibility that the Thule expansion into the eastern Arctic took place later than the conventionally accepted date of A.D. 1000. However, it was Robert McGhee who in a series of papers reinterpreted radiocarbon dates and championed a much later date for the arrival of the Thule, in the thirteenth century (McGhee 2000, 2009a, 2009b). Other researchers appear to have been convinced by the overall thrust of his argument, although the precise date of entry, especially into the westernmost parts of the Canadian Arctic, might be slightly earlier (e.g., Friesen 2009:245; Friesen and Arnold 2008; Morrison 2001, 2009:175). If we therefore err on the side of caution and assume that the Thule had not arrived anywhere occupied by the Dorset before the beginning of the twelfth century A.D. then, given the uncertainties inherent in radiocarbon dating generally and especially in the Arctic, we need to focus our attention on Dorset sites producing post-tenth-century dates (hereafter referred to as “Terminal Dorset”) if we are seeking evidence of contemporaneity between Thule and Dorset.

To illustrate the complexity of interpreting radiocarbon dates to assess whether these two cultures were contemporaries in the eastern Arctic, Figure 34.1 presents published radiocarbon dates from especially well-dated Dorset and Thule sites and site localities in their geographical context. All dates were run on terrestrial materials and have been normalized and then calibrated with CALIB 4.1.2 using the INTCAL98.14C database (Stuiver et al. 1998; Stuiver and Reimer 1993). The dates are expressed as 1σ ranges showing multiple intercepts. Every published date between A.D. 1 and A.D. 1800 from each site is presented.

Starting from the easternmost part of the region, it has long been recognized that in the island of Newfoundland a long, successful, and apparently continuous Dorset occupation ended by around A.D. 800 (Renouf 1999; Renouf and Bell 2009; Tuck and Pastore 1985). Given the date of the disappearance and the fact that Newfoundland was the only region once inhabited by the Dorset that was never subsequently occupied by the Thule, the latter can have had no role in Dorset's disappearance here. Until recently, most proponents of Dorset-Thule contemporaneity focused on neighboring

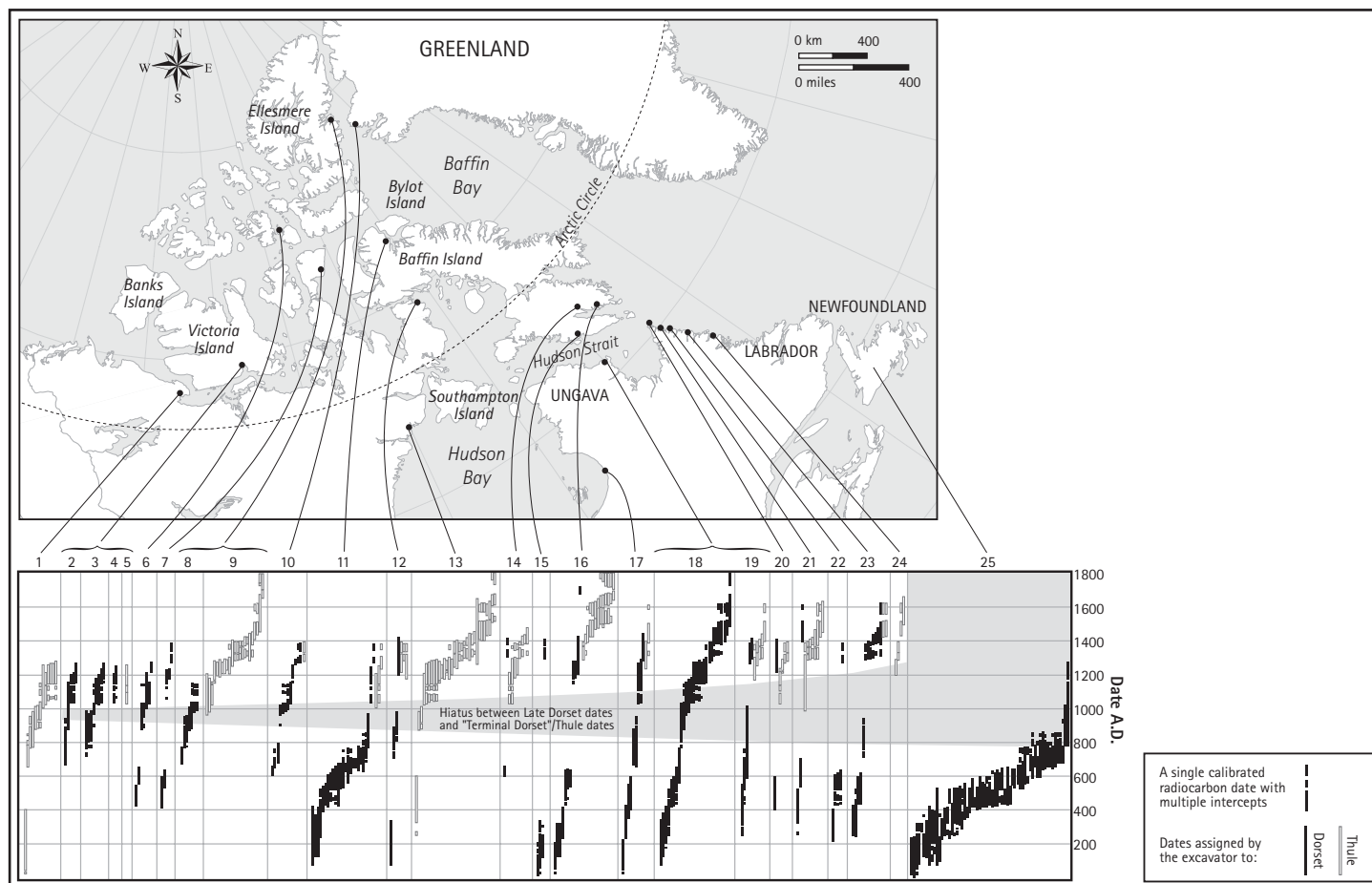


FIGURE 34.1 Dated sites and site localities: (1) Beulah, Clachan; (2) Bell; (3) Cadfael; (4) Freezer; (5) Pembroke; (6) Tasiarulik; (7) Loon Lake; (8) Franklin Pierce, Longhouse, Mist, Oldsquaw; (9) Eskimobyen, Skraeling Island; (10) Qeqertaaraq; (11) Nunguvik; (12) Freuchen, Tikilik, K'aersut, Kapuivik; (13) Ahmai, Daylight, Igluligardjuk, Kamarvik, Meliadine-1, Meliadine-2, Rainbow, Silumiut; (14) Crystal II, Tungatsivvik, Peale Point; (15) Nanook; (16) Kamaiyuk 1, Kuyait 1, Newell Sound 4, Willows Island 1, 4; (17) Kuujuarapik, IcGm-5, Gulf Hazard 1, 5, 7, 8; (18) Dia.4; (19) Qilalugarsiuvik; (20) Staffe Island 1; (21) Nunaingok 1; (22) Avayalik Island 1; (23) Shuldham Island 9; (24) Iglosiatik Island 1; (25) sites from throughout Newfoundland.

Drawing by Robert W. Park

Ungava and Labrador, where by far the largest number of radiocarbon dates have been ascribed to Terminal Dorset, many of them extending into the fifteenth and sixteenth centuries A.D. (Figure 34.1: site localities 17–24). At most of these well-dated sites there is a hiatus between an earlier set of Dorset dates and Terminal Dorset dates, but based on the radiocarbon evidence, researchers concluded that the Dorset and Thule coexisted in this region for centuries (e.g., Fitzhugh 1994:241, 259; Plumet 1979:116; Plumet and Gangloff 1987:86).

To the west and north of Ungava and Labrador, although organic preservation is often far better, the same distinctive pattern in radiocarbon dates can be observed: relatively continuous sequences of Late Dorset dates that come to an end by approximately the ninth century, followed by a hiatus of one or more centuries, and then a small number of Terminal Dorset dates commencing in the eleventh or twelfth century, simultaneously with Thule dates at the same site or within the same region. Sites exhibiting this pattern are known from Foxe Basin, Baffin Island, and the High Arctic (Figure 34.1: sites 7, 10, 11, 12, 14, 15, 16).

Further west, Friesen (2004) interprets a series of new radiocarbon dates from southern Victoria Island sites as confirmation of Dorset-Thule contemporaneity in that region. Radiocarbon dates obtained from the Bell, Freezer, and Cadfael sites (Figure 34.1: sites 2, 3, 4) fill an important geographic and chronological gap in our knowledge and, intriguingly, reveal the same hiatus identified elsewhere in the Arctic, albeit occurring slightly later and for a shorter duration than in the east. Thus, with the dates from Bell, Freezer, and Cadfael we have evidence that southern Victoria Island was also abandoned by the Late Dorset sometime before A.D. 1000. Moreover, the later Terminal Dorset dates from these sites coincide precisely with dates from Thule sites in the region (Figure 34.1: sites 1, 5).

There are two issues that merit study regarding the Terminal Dorset dates from all these regions: First, why does there appear to have been a consistent hiatus between the Late Dorset and Terminal Dorset dates? Second, are all or at least most of the Terminal Dorset really Dorset, or do they derive from Thule occupations at the same sites?

Hiatus

Figure 34.1 highlights the apparent hiatus between series of Late Dorset dates and series of Terminal Dorset dates at many of these well-dated sites and regions. The most straightforward inference is that the Late Dorset colonized these sites or regions and subsequently abandoned them for a period of centuries before returning. That is the scenario proposed by Friesen (2004:690), who speculates that “the migration of Late Dorset people throughout the Arctic may simply not have been sustainable in all regions, leading to complete or partial depopulation of some areas shortly after their initial settlement.” This model requires the existence of a relict Dorset population which survived a ninth- or tenth-century A.D. depopulation of much of the Dorset world and, for reasons unknown, a century later recolonized vast areas of its former

range. A clue as to where to look for such continuous occupations comes from the earlier transition from Middle Dorset to Late Dorset. Helmer (1996:305) has noted that one of the “more noteworthy features of this cultural episode [is] the fact that a large part of the Eastern Arctic appears to have been re-colonized during the Late Dorset period following an extended interval of local abandonment.” The source of the Late Dorset recolonization of these abandoned regions is presumed to be the so-called Core Area region, which includes “at least both shores of Hudson Strait, the islands at its western mouth, the vicinity of Fury and Hecla Strait, northern Baffin Island, and at least southern Bylot Island” (Maxwell 1976:5). In comparison with other regions of the Arctic, the resources of the Core Area region are considered both more abundant and more reliable, and archaeological sites within this region are often large and give evidence of lengthy occupancy.

Thus, if in the eighth or ninth century the Late Dorset abandoned and then, in the eleventh or twelfth century, recolonized parts of the Arctic including Labrador, part or all of the High Arctic, and southern Victoria Island, we might look first to the Core Area region for evidence of continuity. Few Dorset radiocarbon dates exist from the vicinity of Fury and Hecla Strait (Figure 34.1: site 12) but from North Baffin Island and from Hudson Strait we do have good evidence of Dorset occupations that were continuous from at least the second century A.D. through to the eighth century (Figure 34.1: sites 11, 18, 19). However, these same well-dated site localities all show evidence of an occupation hiatus beginning around A.D. 800 or 900. In other words, even within the Core Area region we do not have evidence of continuous occupations from Late Dorset through to Terminal Dorset (Figure 34.1: sites 11, 12, 14, 15, 16, 18, 19). As noted in Park (2000:200), the best radiocarbon evidence for Dorset occupation during this ninth- to tenth-century A.D. period is at some sites in the High Arctic (Figure 34.1: sites 6, 8) but it is difficult to imagine that the population of that region would have been sufficient to support a recolonization of the Low Arctic in the eleventh or twelfth century. Therefore, we really do not have a good candidate for a “Late Dorset Refugium” from which large parts of the eastern Arctic could have been repopulated by the Dorset in the tenth century. That leads to the second question raised by the hiatus: are all or most of the Terminal Dorset dates really Dorset?

Really Dorset?

For the sites in Labrador and Ungava (Figure 34.1: sites 17–24), given the apparent absence of continuity from pre-eighth-century Dorset dates to the post-tenth-century Terminal Dorset dates and the high degree of similarity in age ranges between the Terminal Dorset and Thule dates from this region, it seems probable that all radiocarbon dates later than approximately A.D. 800–900 derive from the Thule occupation of this region (Park 1993, 2000). The evidence supporting that hypothesis is outlined at length in Park (1993:208–213), but it draws together several lines of evidence: intensive reuse of Dorset sites by the Thule, poor stratigraphic separation between Dorset and

Thule occupations, acid soils poorly preserving organic artifacts, and the fact that Thule did not make flaked stone tools and made only limited use of ground stone. Thus, a site occupied sequentially in Dorset, Thule, and historic times might be expected to produce numerous Dorset flaked and ground-stone artifacts, an extremely small number of Thule ground-stone artifacts or none at all, historic artifacts, and datable charcoal from any of these components—precisely what is found at these sites. A well-known example of this kind of site is Dia.4 in the Ungava Peninsula (Figure 34.1: site 18) where, despite the presence of an architecturally diagnostic Thule winter house and other evidence of a Thule occupation (Park 1993:211–212), all post-tenth-century radiocarbon dates were ascribed by the excavators to Terminal Dorset. Interestingly, the sequence of dates at Dia.4 closely matches the sequence of Thule dates from sites in nearby Frobisher Bay and in northwestern Hudson Bay (Figure 34.1: sites 13, 14 and 16), and recent studies here further support the conclusion that the later dates all derive from Thule (Pinard and Gendron 2009:255–257).

For the Foxe Basin, Baffin Island, and High Arctic sites (Figure 34.1: sites 7, 10, 11, 12, 14, 15, 16), detailed discussions are presented in Park (1993) and Park (2000) but many of the sites are clearly multicomponent, and since the 1950s it has been recognized that it was common for the Thule to reuse old Dorset sites. The Thule may have done this simply because the Dorset had chosen the most optimal locations on the landscape for access to resources or because the abundant vegetation growth on top of Dorset midden deposits provided attractive building material for Thule sod houses (McGhee 1983:26; Maxwell 1985:241). Thus, it should not be surprising to find datable Thule materials thoroughly mixed with Dorset materials at these sites. These observations and inferences were the basis for concluding that the post-tenth-century radiocarbon dates ascribed to Terminal Dorset throughout the eastern Canadian Arctic and Greenland all derive from Thule occupations (Park 1993, 2000).

The Bell, Freezer, and Cadfael sites (Figure 34.1: sites 2, 3, 4) will be discussed at more length since they were not discussed in Park (1993, 2000) and because Friesen (2004:688) argues convincingly that all the dates from them do indeed derive from two separate Dorset occupations. The argument that these dates cannot be Thule rests on two lines of evidence. The first is based on the proposition that the Ekalluk River region “was probably unattractive to Thule immigrants because of a lack of concentrated subsistence resources in the form of the larger sea mammals, such as whales and walrus, that form the cornerstone of Thule economies in many regions” (Friesen 2004:690). The argument that we should not expect to find evidence of Early Thule occupations at any of these sites is not convincing. No location with abundant wildlife resources would have been overlooked by the Thule and, to the extent that we understand the initial Thule incursion into the Canadian Arctic, there is no evidence that they were initially drawn only to locations where they could hunt bowhead whales or walrus (Morrison 2000:226, 2009:167; Park 2001). There is also abundant evidence for intensive, year-round Thule use of the Ekalluk River region, including at the Bell site. Finally, Thule warm-season occupations, which are archaeologically poorly visible, are especially likely in this region, as Friesen (2004:686) acknowledges: “All of these people

were drawn to the area by abundant warm-season resources in the form of migrating caribou and arctic char.” Thus, the inference that Early Thule occupations in this area should be unexpected is unwarranted—on the contrary, given how close this region is to known Early Thule sites, it would be unexpected not to see Early Thule use of this region.

The second line of evidence that these dates are not Thule, based on site stratigraphy, is much more compelling. For the Freezer site, Friesen indicates that it contains no evidence of a Thule occupation; at the Bell and Cadfael sites he notes that the dated caribou bones came from recovery contexts that are horizontally or stratigraphically separated from the Thule components at those sites. For these reasons he contends that the dated bones do not derive from the Thule. However, at the Bell site there is an extensive Thule component, including six winter houses (Taylor 1972:54–56, Friesen 2004:687). All of the dated samples came from between 19 and 36 centimeters deep within a single test pit which also produced four Thule artifacts in its upper levels. Friesen (2004:687) describes the dated samples as being recovered “from a sealed, purely Dorset context.” However, many site formation processes affect the stratigraphy at multicomponent, multiseason sites such as this. An illustrative example of a site-formation process complicating the stratigraphy of a similar site was given by George Lyon, captain of the ship *Hecla*, which wintered at Igloolik in 1822. Near the end of July, Lyon visited the semi-subterranean houses which the Inuit inhabited each winter and in describing the site he noted that

The ground all around was strewed with skulls and skeletons of animals. . . . Bones indeed were so numerous, that we literally trod on them. A large stagnant field of mud surrounded the place, adding its full share of sweets, as it was constantly ploughed up by all who walked through it to the huts: the bottom of this also felt as if covered with bones. (Lyon 1824:236)

Such a process could easily churn up and introduce later materials into stratigraphically earlier deposits at sites occupied during the summer. The two dates from the Freezer site are more convincing because, despite admittedly confused stratigraphy, Friesen found no Thule artifacts at this location, just Dorset and Historic Inuit. However, warm-season Thule sites generally produce few diagnostic artifacts but often abundant faunal remains so it is impossible to rule out an early Thule presence here. The same applies for the Cadfael site, where at least one diagnostic Thule artifact has been found on the surface just 50 meters from the component investigated by Friesen (2004:687). It is thus impossible to rule out the possibility that the post-tenth-century dates at these sites might derive from Thule, just like the dates of comparable age at sites elsewhere, although the probability of them being Dorset would be increased if a better explanation for the hiatus could be found. However, given all the uncertainties involved in interpreting these and other radiocarbon dates, corroboration of a Terminal Dorset presence in these regions from other categories of evidence seems desirable.

Artifact Context

A large number of diagnostic Dorset culture artifacts have been found in Thule features and a few diagnostic Thule artifacts have been found in Dorset features. It is of course possible that the presence of those items in dwellings belonging to the other culture could have been the result of exchanges that took place during face-to-face encounters. However, it is clear that the Thule very often chose to camp at locations previously used by the Dorset and at many of those sites it seems evident that the Thule deliberately chose to reuse Dorset structures. Thus, the occurrence of many Dorset artifacts in Thule features can be attributed to accidental incorporation during the construction of the Thule structures (Park 1993:213–216). Park (1993:221–225) argues that many or all of the remainder can likely be explained by deliberate “salvage,” the term Schiffer (1987:104, 118–119) defines as “The process of reclaiming artifacts, including structures, from occupations by earlier peoples at a site.” Therefore, if any Dorset artifacts found in Thule structures were indeed the result of exchanges that took place during face-to-face encounters, they are almost impossible to isolate from the vast majority that got there through accidental incorporation or deliberate salvage.

The much less frequent discovery of diagnostic Thule artifacts in Dorset features or in Dorset stratigraphic levels clearly cannot be explained in the same fashion, and provides more compelling evidence for exchange. For example, at the Brooman Point site on Bathurst Island, McGhee (1997:211) found a diagnostic Thule knife handle in a Dorset feature showing no other evidence of Thule disturbance or use. Similarly, at the Qeqertaaraq site in Greenland some diagnostic Thule artifacts were found in a Dorset feature (Appelt and Gulløv 1999:Figure 7, 2009:307–308). However, in the latter case, radiocarbon dates and the feature’s complex history of occupation raises the possibility that the Thule, who occupied other parts of the same site, introduced those artifacts themselves (Appelt and Gulløv 1999:12; Park 2000:199). There was also an extensive Thule occupation at the Brooman Point site, so it is entirely plausible that a Thule person, perhaps a child, left the broken knife handle in the Dorset structure. Because of the nature of the Arctic environment, especially at sites that were occupied during the summer, even finds like these that were apparently stratigraphically within a Dorset layer might be the result of Thule reuse of a site.

Acculturation

Purported instances of acculturation were until recently a mainstay of arguments that Dorset-Thule interaction took place. Examples of technologies that were proposed as having passed between the Dorset and the Thule included snowhouse construction, cold-trap entrance passages, and raised rear sleeping platforms in winter houses, breathing-hole sealing, soapstone vessels, bone sled shoes, some clothing styles, some harpoon head styles, the use of ground slate, and the extensive use of iron. However, the traits proposed as having passed from the Thule to the Dorset, such as cold-trap

entrance passages, were already in use by at least some Dorset prior to the earliest possible Thule arrival (Park 1993:216–217). And for the traits believed to have passed from Dorset to Thule, with one exception either the Thule already possessed them before their departure from Alaska or the traits would have been entirely plausible and logical independent developments for the Thule to have made upon their arrival in Arctic Canada (Park 1993:217–219).

The only truly compelling and widespread stylistic or technological evidence for Dorset-Thule acculturation lies in similarities between Eastern Thule harpoon head forms that have no antecedents in Alaska and the Bering Strait region but that instead closely resemble some Dorset harpoon head forms. These similarities were first noted and ascribed to acculturation in the 1930s by Henry Collins. However, subsequent researchers have noted that the Dorset-influenced Thule harpoon heads are not found at stylistically early Thule sites in the Canadian Arctic and Greenland. Instead, they are characteristic of substantially later Thule occupations in these regions. This seems incongruous if one assumes that the Thule adoption of these forms would have taken place in the context of direct interaction with people of the Dorset culture, as this would presumably have been most extensive soon after the Thule arrival in the region. Instead, the Thule appear to have adopted them as much as several centuries after their arrival in the eastern Arctic. The most parsimonious explanation for this chronological discrepancy appears again to lie in salvage. There is abundant evidence that the Thule commonly salvaged certain kinds of Dorset artifacts, especially harpoon heads (Park 1993:221–225), and this therefore provides a plausible explanation for why the Thule did not adopt Dorset styles until some considerable time after their arrival in the Canadian Arctic: the means by which they came into contact with Dorset harpoon styles was not through encounters with Dorset people but rather through salvaging Dorset harpoon heads from archaeological sites. For these and similar reasons, much of the previously accepted evidence for widespread Dorset-Thule acculturation has been reevaluated and rejected (Friesen 2000:206; McGhee 1997:210; Morrison 1999:140; Park 1993, 2000; Savelle et al. 2009:225–226; Schledermann 1996:101–102; Sutherland 2005:5).

Genetics

A new and revealing form of data relevant to the question of whether contact took place between individuals of the Dorset and Thule cultures comes from recent genetic studies of human remains and of existing Arctic populations. As outlined in much more detail by Tackney et al. (this volume, chapter 2), data from mitochondrial DNA (mtDNA) provides information on population affinities. Because mtDNA is inherited solely from a person's mother, it can be used to trace maternal lineage far back in time. For the purposes of this chapter the relevant genetic units of analysis are subhaplogroups, of which only six are known from the prehistoric inhabitants of Arctic Canada and Greenland: A2a, A2b, D2a, D2a1, D3a2a, and D4e (Raghavan et al. 2014).

Although only a relatively small number of Paleoeskimo inhabitants of the Canadian Arctic and Greenland, including the Dorset culture, have been studied, all belong to subhaplogroups D2a, D2a1, or D4e, which is ancestral to D2a1 (Gilbert et al. 2008; Hayes et al. 2005; Raghavan et al. 2014; Rasmussen et al. 2010). Their mtDNA data are thus very different from those of the Thule and their Inuit descendants, a great many of whom have been studied and who all belong to subhaplogroups A2a, A2b, or D3a2a (Gilbert et al. 2007, 2008; Hayes et al. 2005; Raff et al. 2015; Raghavan et al. 2014; Saillard et al. 2000:722).

Genetic data also shed light on the Sadlermiut people of Southampton Island, whose origins have figured in discussions of Dorset and Thule contact. The last survivors of this group died out at the beginning of the twentieth century, but since the 1940s it was believed that they had been the descendants of an isolated Dorset population. This inference was based on fragments of ethnographic information that we possess about them from European visitors and neighboring Aivilingmiut Inuit, and from the study of their material culture which included the extensive use of flaked stone tools, unlike the Thule or their Inuit descendants elsewhere in Arctic Canada or Greenland. Other aspects of their material culture showed clear Thule antecedents, and were therefore interpreted as due to the effects of acculturation or intermarriage with the Thule. However, all the Sadlermiut remains that have been studied belong to subhaplogroups A2b and D3a2a, consistent with a solely Thule ancestry (Hayes et al. 2005; Park 1993:220; Raghavan et al. 2014; Rowley 1994).

Thus, the analysis of data from the Canadian Arctic and Greenland has led genetics researchers to conclude that a complete population replacement took place between the Dorset and the Thule (Hayes et al. 2005:25; Raghavan et al. 2014). From the perspective of assessing contact between the Dorset and Thule, minimally we can state that no descendants in the maternal line of Dorset women have been found among the Thule or the Inuit anywhere in Arctic Canada or Greenland.

Site Distribution

Before exploring the final criterion—the distribution of Late Dorset and Terminal Dorset sites—it is useful to summarize the evidence presented so far so as to establish expectations. The existing radiocarbon dates can be interpreted to demonstrate an overlap of as much as two centuries between the two cultures, but it is also possible to interpret them as demonstrating that the Dorset had largely disappeared before the Thule arrived, apart from the isolated group that became the Sadlermiut. Only a handful of artifacts have been found in contexts suggestive of exchange between the cultures and all those instances have equally plausible alternate explanations consistent with the Dorset having disappeared prior to the Thule arrival in the eastern Arctic. The only good evidence for acculturation between the two cultures, apart from the Sadlermiut, is the Thule adoption of Dorset harpoon head forms but this took place at a time suggestive of salvage rather than culture contact. And finally, there

is good genetic evidence that intermarriage between the two groups was minimal or nonexistent.

Researchers convinced that the radiocarbon dates demonstrate overlap between the two cultures have therefore had to develop models that would account for the two cultures inhabiting the same regions but not exchanging material culture, ideas, or marriage partners. Maxwell outlined such an avoidance scenario based on economic exclusion:

Dorset people may have dwindled in numbers as the better caribou crossings and fish weirs were taken over by bow and arrow-equipped Thule people, able to operate in larger social groups by virtue of the quantities of whale meat that supported their communities. Dorset people and culture may have been pushed to peripheral, less desirable regions . . . (Maxwell 1984:368)

McGhee makes a similar argument, predicated on plausible differences in social organization between the two groups:

The fact that many early Thule villages are built on the remains of late Dorset communities indicates that both groups were attracted to the same locales because of the economic advantages of such sites. . . . Direct competition for such locales might be expected to have usually led to the sort of rapid displacement of Dorset people that is described in the stories of the Tunit. The repetition of many such small-scale local events, with the Dorset Palaeo-Eskimos retreating continually to more isolated and less economically viable areas, would have eventually resulted in the disappearance of the Dorset way of life without the development of significant contact or cultural exchange. (McGhee 1997:212)

Elsewhere, however, McGhee (1984, 2009b) speculates that the Thule learned from the Dorset the location of meteoritic iron in Greenland, and that this information prompted and guided the Thule migration into that region. The kinds of interaction between the two cultures that presumably would have been necessary for that kind of information to be communicated seems inconsistent with the lack of other evidence of exchange or acculturation between the two cultures.

Friesen (2000) presents the most comprehensive avoidance model, focusing on the social differences between the two societies. He concludes:

In the end, the very openness which made Dorset society supremely adapted to the central Arctic may have doomed them to cultural extinction at the hands of a more aggressive people. Thus, we should see little contact between groups of this nature, due to potentially active avoidance of Thule invaders on the part of Dorset groups. (Friesen 2000:216)

He acknowledges that this scenario of extreme and active avoidance would be beyond the range of hunter-gatherer behavior as known from ethnography but argues that the

Arctic conditions which shaped Dorset culture may have been beyond those experienced by most recent hunters and gatherers (Friesen 2000:216).

As both McGhee and Friesen note, the avoidance model predicts that there should be evidence from radiocarbon dating that the two cultures overlapped one another, and it also predicts that there should be little evidence of exchange, acculturation, or intermarriage between them. The archaeological data summarized above would be consistent with these predictions. However, the avoidance model also implies another prediction that has not yet been evaluated: the most recent Dorset sites in a region that the Thule have already entered—i.e., the Terminal Dorset sites—should be situated in different, less advantageous locations. In other words, we should see a significant change in Dorset site distribution as they began to avoid the Thule and as the latter took over the most economically advantageous locales. However, what we see appears inconsistent with that prediction. Within the coarse chronological resolution offered by radiocarbon dating, the Terminal Dorset dates occur at many sites after long Dorset absences from those sites but coeval with the appearance of Thule at the same sites or in the same region. That is the case at the southern Victoria Island sites as well as at many others (Figure 34.1: sites 2, 3, 4, 5, 11, 12, 14, 19, 20, 21), including the very well-dated site of Nunguvik (site 11) that had been abandoned by the Dorset by the ninth century. Following a hiatus of approximately two centuries, Terminal Dorset dates appear at Nunguvik again at the same time as the Thule began living there. Even if we could identify a region or regions to which the Late Dorset population retreated in the ninth century, it is difficult to imagine a plausible avoidance scenario in which the Dorset would return to their former locales just at the time when the Thule were arriving and appropriating them. Therefore, on the basis of existing site distribution evidence the avoidance model is not yet supported.

ALTERNATIVES TO THE AVOIDANCE MODEL

If most of the Dorset were gone by the time the Thule entered the eastern Arctic, then what happened to them? Is it possible or plausible for almost all the Late Dorset to have died out prior to the arrival of the Thule? There do seem to be precedents: the High Arctic, the western Canadian Arctic, and southern Baffin Island were all occupied in Early and/or Middle Dorset times but were abandoned, and there is a long hiatus between the latest of these occupations and the earliest Late Dorset occupations in those regions. Further, the Dorset disappeared forever from Newfoundland by the eighth or ninth century following an extended Dorset occupation that has been described as “remarkably successful” (Tuck and Pastore 1985:71) and “clearly successful” (Renouf 1999:408). If all those regional extinctions or abandonments are real and not simply artifacts of limited research and dating, we can conclude that Dorset adaptations were vulnerable to failure under a variety of circumstances since there were significant differences in climate, resources, resource distribution, ice conditions, and so on, between those far-flung regions.

As documented above, the onset of the dating hiatus between Late Dorset and Terminal Dorset dates in Labrador, Ungava, and Baffin Island suggests that those regions became depopulated at around the same time as Newfoundland, and the hiatus in dates on Victoria Island suggests that it too suffered a depopulation shortly afterwards. So to postulate that the Late Dorset had largely died out by the tenth century merely requires that we see all these regional depopulation events as part of a single process. Many researchers have commented on the unity or interconnectedness of the Late Dorset world as revealed by its stylistic and technological homogeneity over vast distances (e.g., Friesen 2000:213; Helmer 1996:306; LeMoine and Darwent 1998:74; McGhee 1996:201; Maxwell 1985:227). Damkjar (2000:177–178) has explained the widespread uniformity by arguing that “The homogeneity we see in these settlements and other aspects of Dorset material culture has much to do with the rapid spread from a more or less central point with many of these cultural traits already under their belt.” If we accept that the Late Dorset populations outside the Core Area resulted from a recent population expansion from that region, then the widespread stylistic uniformity is exactly what we would expect. It would also follow that the Late Dorset population within any given region would have been very small (e.g., Odess 1998:420; Schledermann 1996:101), and such a scattered small population would have had difficulty maintaining the minimum population level both for biological reasons and for the kind of social support network required by foragers in such an environment (Odess 1998:421). The disappearance of Dorset from Newfoundland has been explained as being the result of periodic failures of critical resources (Tuck and Pastore 1985:77), which must have combined to overwhelm the social mechanisms that the Dorset had successfully used to mitigate the effects of such failures (Renouf 1999; Renouf et al. 2000). Renouf and Bell (2009:270–271) contend that the abandonment of a single key site linking Newfoundland and Labrador—Phillip’s Garden—helped precipitate the Dorset population collapse in that region. Whether or not that particular inference is correct, it is possible to imagine a major regional extinction in Newfoundland and Labrador putting neighboring regional populations in a very precarious situation indeed through the loss of this social network. As noted by Schledermann,

A small population of any kind can be endangered in a number of ways, particularly in a region easily affected by minor environmental and ecological conditions. One disastrous hunting season or the accidental death of the best hunters could have led to starvation and demise of a small group of people. (Schledermann 1996:101)

It is thus surely conceivable that an unusual combination of such small catastrophes could have precipitated broad regional extinctions within a few generations.

CONCLUSIONS

On the basis of the available evidence it seems unlikely that the Dorset and Thule ever came into contact with each other in most parts of the Arctic. Probability must to some

extent lie in the eye of the beholder and the tentativeness of these conclusions reflects the inevitable difficulty of proving a negative—i.e., establishing that the Dorset *did not* come into contact with the Thule. But as this chapter has attempted to demonstrate, there are testable hypotheses in this case and the tests suggest that contact did not take place. If face-to-face contact took place between people of the Dorset and Thule cultures then we would expect to see genetic evidence of intermarriage—i.e., we would expect to see at least some Dorset women's descendants, who would carry the subhaplogroups D2a, D2a1, or D4e, among the later Thule and their Inuit descendants. We would also expect to find significant evidence of Dorset-Thule acculturation in their descendants' material culture. The absence of both of these kinds of evidence has led some archaeologists not to discard the contact hypothesis but instead to create an avoidance model—i.e., the hypothesis that the Dorset actively avoided the Thule. If this model is valid it should be possible to document a change in Dorset settlement patterns at the time the Thule arrived, and Terminal Dorset sites should be found at locations not previously used by the Dorset. Locations successfully colonized by the Thule, such as the Nunguvik site or the Ekalluk River region of southern Victoria Island, should subsequently have been avoided by the Dorset—these locations thus should not produce Terminal Dorset radiocarbon dates. None of these predictable consequences of Dorset-Thule avoidance are evident in the archaeological record. Instead, the absence of evidence for intermarriage, acculturation, or avoidance is accompanied by evidence from radiocarbon dating that is consistent with the Dorset having disappeared from sites and regions prior to the earliest likely date of the Thule arriving.

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CHAPTER 35

CLASSIC THULE [CLASSIC PRECONTACT INUIT]

PETER WHITRIDGE

INTRODUCTION

THE precontact Inuit (“Classic Thule”) lifeworld can readily be carved up into a series of discrete topical areas reflecting such things as the history of research, the chronological unfolding of Inuit history, and the character of particular domains of precontact life (material culture, economy, social life, belief systems) that are given both by the nature of the archaeological record and by analytical conventions that have taken shape in the discipline over the past century. This is largely the tack adopted here. It should be remembered, however, that this organization has inherently limited bearing on the universe as Inuit people lived and understood it—which was undoubtedly shot through with more belief and less system than archaeologists would normally be comfortable with. It seems equally possible (although more difficult, and riskier) to attempt to enter into this world in substantially different ways—from the perspective, for example, of Inuit cosmologies that understand the relationships between people and between people and nonhuman creatures in fashions that Western archaeology typically disallows (Wenzel 1991), or from the perspective of women or children or ritualists rather than that of adult male hunters and household heads. While the nonarchaeological and the perspectival are perhaps necessarily suspended here, they stand as silent witnesses and challenges to the accounts we provide of the lives of people in the past.

Before proceeding further, a note on terminology is in order. “Thule” has been used to refer to a precontact culture in the North American Arctic since Therkel Mathiasen (1927) first employed the term, in recognition of the Fifth Thule Expedition that provided the logistical umbrella for his pioneering research. Thule is the name that Peter Freuchen and Knud Rasmussen had given the trading post in northwestern Greenland from which the project was launched, in joking reference to the far northern island (“Ultima Thule”) of classical geographers from the fourth century BC (Rasmussen 1969

[1927]). However “Thule” also named a mythical Aryan homeland for members of the early twentieth-century Thule Society (who likewise read the classics). Members of this racial supremacist group founded the German Workers Party, which Adolf Hitler reorganized as the National Socialist German Workers (Nazi) Party (the label has been recently resurrected in Germany by the neo-Nazi “Thule Seminar”). Although Freuchen’s and Rasmussen’s Thule post (founded 1910) clearly predates the naming of the proto-Nazi Thule Society (in 1918; Phelps 1963), both names spring from a northern European romanticism that seems largely irrelevant to the Inuit past. Of course any terms (prehistoric, precontact) that archaeologists might adopt will inevitably channel a Western scientific chauvinism, but Inuit is the term of self-reference employed by most Canadian Arctic indigenous groups, and has been adopted by some pan-Arctic organizations. In any case, “Thule” has problematically distinct regional usages (for example in Labrador, Nunavut, and Alaska), and of course contact with post-Norse Europeans (the notional Thule-Inuit hinge) occurred at widely varying times between the sixteenth and nineteenth centuries. Eastern Arctic archaeologists’ “Thule culture” usually refers simply to “precontact Inuit,” and so where possible versions of the latter are used in preference here.

NATURE OF THE PRECONTACT RECORD

The precontact Inuit record consists of a variety of seasonal settlement types (winter villages, summer camps, travel camps) and features (semisubterranean house depressions, tent rings, qariyit [festival houses], inuksuit [cairns], burials, caches, hearths, fox traps, hunting blinds, boat rests, trails, play houses, hopping stones, etc.), and the artifacts, animal and plant remains, and even human tissue they contain; stray artifacts and debitage; and a vast scatter of slowly deteriorating animal bone. This record also clearly includes a contemporary arctic biome transformed in many details by generations of Inuit and pre-Inuit harvesting and land use, including organically enriched village sites, chemically altered ponds (Douglas et al. 2004), and animal populations shaped by centuries of harvesting and coresidence with humans in the north (e.g., Alter et al. 2012). Less obviously, perhaps, it embraces the textual residues of precontact terminology and placenames (with a material, documentary reality); the historical kernel of contemporary Inuit stories, understandings and practices (the rationale for an ethnoarchaeology); and a contemporary human molecular legacy of millennia of population movements, interactions, and drift. Although arctic archaeologists concentrate on the artifacts, ecofacts, features, and sites, the discipline constantly spills across these boundaries into bioarchaeological, anthropological, biological, and geological problem areas.

The most characteristic features of this record are its exceptional preservation and visibility. Although sediment deposition, soil formation, and coastal erosion have obscured or destroyed some proportion of sites, especially in the Western Arctic where submergent coastlines have erased great swaths of coastal settlement (e.g., Friesen 2013),

in much of the Canadian Arctic isostatic emergence has outstripped eustatic sea-level rise over the course of the Holocene, with the result that settlements once positioned just above the storm ridge for ease of maritime travel are now suspended some meters above contemporary sea level. This removes them not only from the zone of active coastal erosion but from burial and (to a certain extent) disturbance by later occupants of the locale. The most pronounced expression of this is the declining age of Pre-Dorset and Dorset sites as one approaches sea level (Dyke et al. 2011), but some separation of Inuit components occurs as well: relatively ephemeral sites and site components relating to a pioneering Inuit colonization of the Central Arctic occur at slightly higher elevations than Classic ones (e.g., on southeast Somerset Island [Dyke et al. 2011]). The elevation of sites above sea level allowed Therkel Mathiassen (1927) to plausibly estimate the age of “Thule culture” settlements to within a couple of hundred years of the period suggested by contemporary radiometric dating (Friesen and Arnold 2008).

Cold and arid conditions and thin vegetation mats afford slight protection for the refuse deposited in and around warm-weather settlements, but these features lie at the ground surface and so the associated assemblages are organically depleted; in many ways these features are less archaeologically tractable than much older pre-Inuit ones that produce abundant imperishable lithic refuse. Land-based winter settlements, however, are characterized by the accumulation of refuse in and around semisubterranean dwelling features during cold weather, rapid sediment aggradation and seasonal vegetation growth, the eventual slumping and infilling of abandoned house depressions, and the consequent incorporation of some archaeological deposits in permafrost (Reynolds 1995). Deposits in entrance tunnels and on house floors may have been persistently frozen since feature abandonment and collapse, and even seasonally thawed deposits in the active zone benefit from lengthy periods of freezing conditions and protection from wind, water transport, and scavengers. Although permafrost complicates recovery, there is more to recover; the resultant rich faunal and artifactual assemblages have allowed detailed archaeological reconstructions of precontact Inuit lifeways.

EARLY SETTLEMENT

Mathiassen's A.D. 1000 estimate for the Inuit colonization of the Eastern Arctic, based on analogy with dated rates of isostatic uplift in Scandinavia, was accepted for decades, before accumulating radiocarbon dating evidence, and a recognition of the inaccuracy of dates on sea mammal materials and driftwood, led to a number of recalibrations of the precontact Inuit chronology. Many arctic archaeologists now recognize A.D. 1200 (and occasionally as late as A.D. 1300; McGhee 2000) as the approximate beginning of the Inuit colonization of the Canadian Arctic, based on a recent suite of radiocarbon dates from stylistically early western Canadian Arctic sites (Friesen and Arnold 2008). A separate and archaeologically distinct population movement—likely arising in northwest Alaska given the nature of decoration of harpoon heads, arrowheads, and

pottery—gave rise to Ruin Island phase settlement on Ellesmere Island and northwestern Greenland somewhat later (McCullough 1989); dates on Greenlandic Norse artifacts from Skraeling Island (averaging A.D. 1246) nicely agree with a documentary record of a Norse ship being lost in the Nordrsetur in 1247 (Schledermann 1980). This agreement reflects the reasonable accuracy of most recent radiocarbon dates on terrestrial mammal bone and short-lived plant materials.

If a substantial precontact Inuit occupation dates to 1200 and later, what should be made of the occurrence at some sites of lightly constructed winter house features at higher elevations than the bulk of precontact remains? The very occasional occurrence of Natchuk harpoon heads (a North Alaskan late Birnirk or Early Thule type) at a string of Canadian Arctic sites (Cape Kellett, Nelson River, Co-Op, Pearce Point, Lady Franklin Point, M-1, Maxwell Bay, Mittimatalik) further hints at an ephemeral pioneering movement from the Mackenzie Delta–Amundsen Gulf region into the Central Arctic. These initial explorers and colonists presumably expanded along the recently Dorset-inhabited and resource-rich south side of Victoria Island, into Prince Regent Inlet or perhaps Peel Sound (Morrison 1999), rather than navigating the desolate, ice-choked coasts of the north side as suggested in the past.

An attraction of this scenario is that it allows for an early Inuit encounter with Late Dorset groups, likely the indigenous Tuniit of historic Inuit tales, and the inception of a *tradition* of Inuit-Tuniit interaction, without implying that contact was a frequent occurrence during the initial stages of colonization. Such interactions may well have occurred in some areas but were almost certainly projected onto the archaeological record (initially the Dorset record, but later the precontact Inuit one) in most in the form of Tuniit stories; there is no Dorset genetic legacy in Inuit populations (Raghavan et al. 2014). If a distinct movement by Natchuk-using pioneers did not occur then we must imagine the independent abandonment of Natchuks and adoption of plainer Thule 3 harpoon heads across a large swath of the Eastern Arctic, and account in some other way for the elevation gap between ephemeral house clusters and Classic-era communities.

The primary source of the Classic migration pulse appears to have been the eastern Mackenzie Delta–Amundsen Gulf region. An assemblage reportedly collected on the Booth Islands, in the border zone off Cape Parry (Morrison 1990), bears a striking resemblance to early Classic ones from the Central Arctic in the stylistic idiosyncrasies of the harpoon heads. One parsimonious interpretation of this similarity would be that the Booth Islands inhabitants are representative of those who settled the Central Arctic around the early thirteenth century. Information regarding the economic potential of bowhead whaling was presumably transmitted west by earlier pioneering groups (how the Dorset could have served as an information vector is unclear). This need not have involved the “return migration” once posited, but rather the inception of communication channels between east and west, such as are also implied by the occurrence of the distinctive Coronation Gulf “Clachan” variety of Thule 2 harpoon head at sites from the Mackenzie Delta to Hudson Bay to Bathurst Island (Whitridge 1999a).

CLASSIC SETTLEMENT SYSTEMS

The Inuit colonization of the Eastern Arctic did not consist in a single, momentary pulse, as migrations are often imagined archaeologically, but rather a long-term, cumulative expansion of Inuit groups into ecozones for which they were not always well prepared, either economically or cognitively (Whitridge 2012). Although some episodes were relatively rapid and long-range, perhaps even leapfrogging areas already occupied by Dorset or other Inuit (such as the Ruin Island phase settlement of Ellesmere Island and northwest Greenland by a North Alaskan-affiliated group), others appear to have been more protracted (such as the 200–250-year-long period of gradual expansion down the Labrador coast). Furthermore, regional occupations did not always persist; the Barrengrounds, South and East Greenland, and Labrador were settled at around the same time that the Canadian Central and High Arctic witnessed large-scale abandonments. The Inuit diaspora played out at personal, generational, and multigenerational time scales, beginning, from a North American perspective, with the movement of ancestral Inuit groups onto the Bering and Chukchi Sea coasts in the mid first millennium A.D. (Mason 1998) and continuing through the massive population upheavals of the twentieth century. For present purposes, this important temporal dimension must be suspended so that a schematic picture of precontact Inuit life between roughly A.D. 1200 and 1500 can be drawn from the archaeological evidence.

The Inuit lifeworld can be pictured as a nested series of spatial horizons. At the largest scale is a pan-Arctic Inuit cultural sphere that extends, in the anthropological mind at least, from Bering Strait to Greenland, and south to the Barrengrounds and Labrador. However, it seems clear that the cultural commonalities across this vast zone are due more to a recent common ancestry than significant multidirectional flows of people, things, or information, at least in the precontact period. Although large swaths of the Arctic do appear to have been connected for a time, this is better understood in terms of interlocking regional trade networks (Friesen 2012; McCartney 1991; Whitridge 2002a). Valuable materials such as iron, copper, ivory, sea mammal oil, caribou hides, wood, and amber moved between adjacent groups, and perhaps occasionally over longer distances through down-the-line exchanges, as Vilhjálmur Stefánsson imagined a Copper Inuit soapstone pot making its way to Greenland. The normally limited spatial scope of trade, however, is suggested by the absence of such portable preciosities as native copper and meteoritic iron more than a few hundred kilometers from their presumed sources.

At a finer scale still, people sharing a dialect and affiliation to a named group (historically designated with the *-miut* suffix, meaning “people of,” as in Aivilingmiut, literally “people of Aivilik”) historically constituted the largest regularly interacting social network. *-miut* groups were sometimes linked with particular land-based winter settlements, sites of repeated seasonal aggregation, and sometimes with looser associations of communities joined by kinship and economic commonality and only occasionally by common residence (such as the temporary snow house communities of the Central

Arctic). Archaeologically, we likely encounter both in precontact contexts. Large, intensively occupied sod house settlements, or settlement clusters, that may have anchored such polities occur in some parts of the Canadian Arctic (e.g., the Mackenzie Delta, east and southeast Somerset Island), but are absent elsewhere (e.g., the High Arctic channels surrounding Bathurst, Cornwallis, and Devon Islands). In the latter areas -miut groups may have been small, or widely dispersed, presumably reflecting the productive possibilities of the region under a precontact Inuit organizational regime.

Regional groups occupied a number of different settlements over the course of an annual round. Savelle (1987) has nicely illustrated the seasonal articulation of these site networks in different parts of the Central Arctic. Winter villages composed of durable sod houses (Figure 35.1), as well as transient households occupying qarmat or even snow houses, were usually the largest seasonal aggregations. Archaeologically, sod house (iglu) villages are by far the best preserved and most conspicuous traces of precontact settlement. The rapid and long-term accumulation of debris at these sites while in use, and collapse or slumping of architectural sod and stone onto house floors after abandonment, often sealed refuse beneath an insulating layer of sediment, resulting in near-perfect preservation of some deposits in permafrost. Large precontact snow house (igluviak) villages are largely inferential. They were reported historically, typically on sea ice (where they would leave no trace) to maximize access to ringed seal, and likely occurred prehistorically, but unambiguous archaeological examples have not been recorded. A dense concentration of sod patches and Inuit occupational debris at Port Leopold may represent a historic example. The ubiquity of snow knives (and related gear, such as shovels and snow

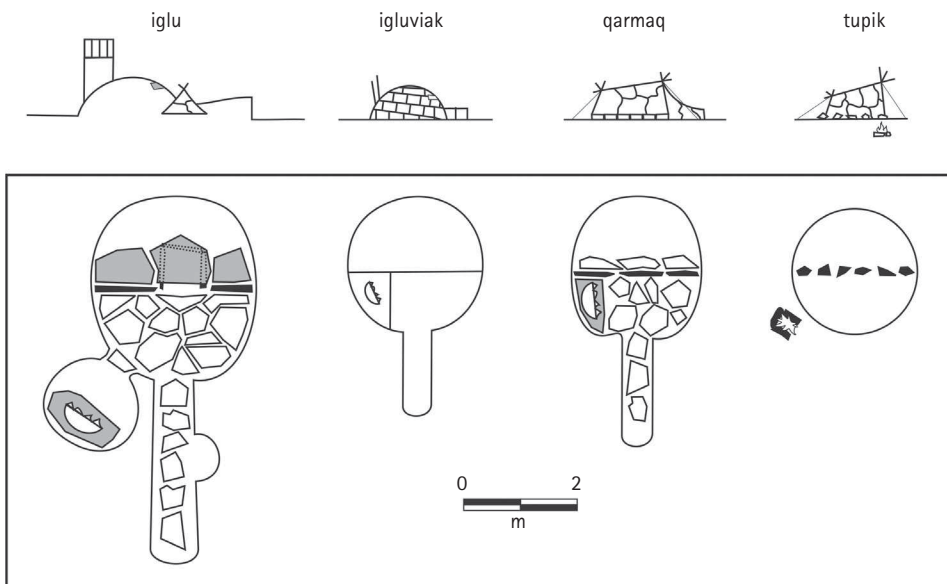


FIGURE 35.1 Principal precontact Inuit dwelling types.

Illustration by Peter Whitridge

probes) in precontact contexts hints that snow houses were an important part of seasonal travel technology (the sophistication of this complex—including dogs, komatiks, kayaks, and umiaks (large open skin boats) —is a key technological divide between Inuit and earlier groups), even where sod houses were the primary winter dwellings.

Large late summer or early fall villages composed of tents (sing. tupik), or more durably constructed qarmat (sing. qarmaq, a hybrid of iglu and tupik consisting of an excavated foundation and skin roof), were occupied during periods of intensive sedentary harvesting of whales, caribou and fish (Savelle 1987). Although preservation of organic artifacts and faunal remains is sometimes marginal at such sites, the spatial arrangement of features can be revealing of settlement organization. For example, the late-summer whaling village of PaJs-4, on southeast Somerset Island, preserves clusters of qarmat joined by visible paths leading to a central qargi (pl. qariyit, a ceremonial or men's house), suggesting that affiliated households, perhaps aligned with individual whaling crews, were nested within a larger organizational grid (Savelle and Wenzel 2003).

Small travel camps, consisting of one or a few tents or snow houses, were periodically occupied by individuals or small numbers of families while on the move, and during periods of the year when larger aggregations were unsustainable. Tent rings occur throughout the North American Arctic, but unfortunately are relatively uninformative about their occupants' lives; short-term occupations produced little refuse, and the absence of a sediment cap results in poor organic preservation. Nevertheless, they represent an important phase of some groups' seasonal round, and point to the antiquity of an essential seasonal periodicity to Inuit social life that Marcel Mauss recognized more than a century ago. Only recent historic versions of small-scale snow house camps have been reported (Savelle 1984), but precontact versions are plausibly identifiable. A variety of other settlement forms occur less consistently, such as camps consisting of individual winter houses, mixed tupik-qarmaq and iglu-qarmaq villages, and ephemeral camp sites represented by stray hearths or "hunter's beds."

Neighborhoods within larger settlements, composed of closely adjoining and sometimes internally communicating residences, constitute a distinct scale of sociospatial integration that does not occur at all large sites, but has perhaps not been attentively sought out. PaJs-4 provides a somewhat exceptional example from a warm-weather site, but clear groupings of two, three, or more sod houses are not uncommon at winter sites (e.g., Skraeling Island [McCullough 1989], Learmonth [Taylor and McGhee 1979], Porden Point [Park 1989], Silumiut [McCartney 1977]). At Qariaraqyuk (PaJs-2), for example, seven such clusters account for 22 of the site's 59 heavy semisubterranean features, including 18 dwellings and four qariyit (Whitridge 1999a). For North Alaska, Burch (1981) notes that this sort of house group, termed upsiksui, consisted of closely affiliated households (e.g., headed by parent and children, siblings, or other kin) that acted together in various economic and social capacities. Savelle and Wenzel (2003) similarly assign the house clusters at PaJs-4 to ilagiit, or extended family groups. Although merely subdivisions of the largest settlements, ilagiit could compose the entire population of small ones.

Families, or groups of families, occupied a seasonally varying array of dwelling types that were perhaps the most symbolically intricate of all settlement settings (Whitridge 2008).

The subdivision of iglu, igluviak, qarmaq, and tupik into distinct spaces for cooking, working, sleeping, and housing food and equipment is reflected in the outline of dwellings visible on the ground surface, and internal features revealed by excavation. The precontact tupik typically had a circular floor plan, divided in the middle by a row of stones that delimited sleeping and work spaces, the latter sometimes including a simple stone hearth or lamp stand. Conical elevations are typically depicted in precontact engravings (e.g., Maxwell 1983), though historic versions were sometimes joined in pairs or had extended entryways.

The precontact iglu in the Eastern Arctic typically included a slab-floored entrance tunnel, sometimes with shelves and alcoves, a paved floor, and an elevated semicircular sleeping platform edged with stone slabs and underlain by a central storage compartment. Some precontact houses consist of two or, more rarely, three platforms (arranged in an L or cloverleaf shape, respectively) facing onto a large paved floor, and paired houses with their own floor areas, sharing only part of a tunnel, also occur. The earliest houses, dating to the exploratory movement and early Classic settlement period, often have a circular kitchen area joined to the house by a short tunnel (e.g., Arnold 1986; Whitridge 1999a). Later Classic houses have shallower kitchen alcoves bulging from the house wall near the tunnel mouth, and the latest precontact houses sometimes have elaborate lamp stands abutting the sleeping platform and no cooking alcove (Whitridge 2008). Consumption of the abundant driftwood likely encountered by early colonists (suggested by the skewing of early Classic radiocarbon dates on driftwood) likely made a detached kitchen progressively less sensible.

Important varieties of occasional dwelling that likely exist but have not been identified are the relatively ephemeral structures reported ethnographically to be used by menstruating women and women in childbirth (Burch 2006). Large sod house settlements are often associated with a variety of non-iglu features, sometimes (as at PaJs-2) including large ovoid depressions that might represent the excavated foundations of such lightly constructed skin- or snow-roofed menstrual structures. Burial cairns also often occur near villages, usually inland of the primary residential zone (i.e., in sight of, but apart from, everyday activities). More occasional constructions include paired stone columns for elevating umiaks and kayaks beyond the easy reach of dogs (Savelle 1987), simple cobble hearths that supported a soapstone lamp, and features utilized in play, such as lines of hopping stones and cobble outlines of houses and boats (Hardenberg 2009; Walls 2012). Inuksuit (cairns which served a wide variety of functions; Hallendy 2000) could consist of only one or a small number of stones placed strategically so as to be visible from a distance. Features grade almost imperceptibly into the portable, manufactured things that we would consider material culture.

MATERIAL CULTURE

Precontact Inuit (and allied Yupik) sites with extensive permafrost likely produce the most highly differentiated hunter-fisher-gatherer assemblages in the world. The profusion of distinct varieties of sometimes delicate manufactured objects (gut parkas,

bird-wing whisks, sinew cord) is only partly due to exemplary taphonomic conditions. More profoundly perhaps, Inuit inhabited a space that was thoroughly and deliberately saturated with the fruits of their own creativity. Whereas many small-scale—and especially mobile—societies have prized technological simplicity, striving to minimize the work of perpetually fabricating their world and hauling it from place to place (Ridington 1982), the Inuit adjustment to the lunar challenge of the Eastern Arctic was premised on the opposite choice: foresee every eventuality and multiply the layers of material buffering between humans and a sometimes malevolent nature. The origins of this cultural pattern lie in northeast Asia, since the Old Bering Sea (OBS) precursor of the Inuit cultural tradition appeared at Bering Strait with a complex material culture already in place that closely resembles that of its Classic descendant.

These elements include the equipment and skills to utilize a wide range of animal materials, which was particularly critical in light of the scarcity of usable plant fibers: bone, antler, ivory/tooth, horn, skin, hair, sinew, baleen, feather, gut, and fat. All of these occur in permafrost assemblages, both in finished forms and as manufacturing detritus (even including rendered animal fat, which can take the form of a slippery congealed layer on house floors). Wood, often harvested from beaches as driftwood that originated either in the North American Subarctic or, via the Transpolar Drift, in northern Eurasia, was an essential component of some technologies, such as boat frames and weapon shafts, and was spliced into composites of suitable size. Although useful plant materials are scarce in most areas, they were sometimes important; heather was used as bedding and sphagnum for diapers and menstrual pads, and cut slabs of sod were a key component of winter house construction. Unworked stone was used abundantly in iglus and other features (tupiks, inuksuit, boat rests), and minerals—nephrite, slate, native copper, meteoritic iron—were gathered from beaches or quarried for tool bits and blades. Clay was sunbaked or lightly fired into oil lamps and pots for boiling liquids in the Western Arctic, but these functions were rapidly assumed by steatite (soapstone) following the colonization of the Eastern Arctic (its value perhaps learned from Dorset groups, or from encounters with abandoned Dorset material culture). Seasonal movements that often seem aimed at food harvesting should be thought of as being partly oriented to acquiring these materials, especially the animal skins (for clothing) and oils (for fuel) that were as essential as food to arctic survival.

Functionally, precontact material culture is conventionally sorted into classes that map major categories of often gender-specific everyday activity. Mathiassen (1927) provides the primary archaeological template for reading the Eastern Arctic record, but there are numerous valuable ethnographic sources from the late nineteenth and early twentieth centuries (e.g., Boas 1964 [1888]). Although the particular groupings vary, the following is a serviceable breakdown of an enormously complex material culture: harvesting, food preparation, household maintenance, men's manufacturing, women's manufacturing, transportation, ornament, ritual, and play. Harvesting gear alone includes various specialized toolkits, such as ones for pursuing marine mammals from watercraft and from sea ice, including toggling harpoons, darts, and lances. Each of these weapons in turn represents a sophisticated equipment complex in its own right

(Whitridge 2004b). For example, the open water harpoon assembly was composed of a harpoon head (often with separate end blade, rivet, and sinew lashing across the socket), moveable foreshaft, socket piece, shaft (sometimes a composite, made up of segments lashed or pegged together), butt piece (sometimes in the form of a composite flight stabilizer), finger rest (for grasping and propelling the shaft), line, line tension piece, float, float toggle, float mouthpiece, float mouthpiece stopper, and float repair piece. The breathing hole sealing harpoon complex included a fixed foreshaft, ice pick at the butt end of the shaft, indicator for the seal's presence, probe (with a replaceable ferrule) for testing the depth of the snow and lie of the hole, scoop for removing slush, and even a stool (composed of a bone or wood seat and stubby wooden legs) for the waiting hunter.

As complicated as these assemblies sound, they are not comfortably segregated from still larger technological complexes related to boat (kayak and umiak) and dog-sled (komatik) travel, since sea mammal harvesting frequently relied on one or the other. By extension, amulets and other ritual gear were likely conceptualized as essential harvesting appurtenances, and the disposition of households within communities (e.g., as members of discrete house groups) expressed a social technology of group living that was eminently concerned with everyday economic arrangements. The tendrils of "sea mammal harvesting technology" penetrate everywhere. Other distinct harvesting assemblages can be delineated—land mammal hunting, trapping, birding, fishing—each with its seasonal variants, regional specialties, and temporal trends, and these wider sorts of cultural entailments as well. As noted below, however, sea mammal hunting was the foundation of most Eastern Arctic economies, and its equipment seems to have varied in somewhat more meaningful ways than other harvesting gear. In particular, harpoon heads carried an unusual semantic burden, their form and decoration shifting repeatedly over the millennium between the appearance of OBS in the west and the arrival of Inuit groups at the eastern margin of their range, and so enacted, at a microstylistic level, a larger societal discourse on human–sea mammal relations.

Mathiassen (1927) influentially sorted precontact harpoon heads into a number of recurrent types. With a few additions and adjustments, this typology has persisted to the present (Figure 35.2). The major Classic varieties are Thule 2, 3, 4, and Nuwuk, but the earlier Natchuk occurs at a handful of sites, the Sicco is a widely distributed early Classic version of the Thule 3, and the Clachan a widespread variant of the Thule 2. The Thule 5 is a special case, appearing at the end of the Classic period and becoming the dominant Eastern Arctic type by later precontact times. Interestingly, in some variants it closely resembles a widespread pre-Inuit type (Dorset Parallel; Maxwell 1985), but with a round rather than flat foreshaft socket (the Thule 1 similarly overlaps in plan with the Dorset type J), and so presumably represents the deliberate emulation of found objects (their absence in early Classic assemblages makes any direct adoption from Dorset groups unlikely). Of even greater analytic utility than these gross types, specific harpoon head attributes vary in patterned ways across the precontact period. The flexible sinew lashing that closes the open socket passes through painstakingly gouged slots in earlier variants, but these are replaced by simpler drilled lashing holes in later ones. In early examples of slotted harpoon heads the end blade was wedged into its slot with the help of converging

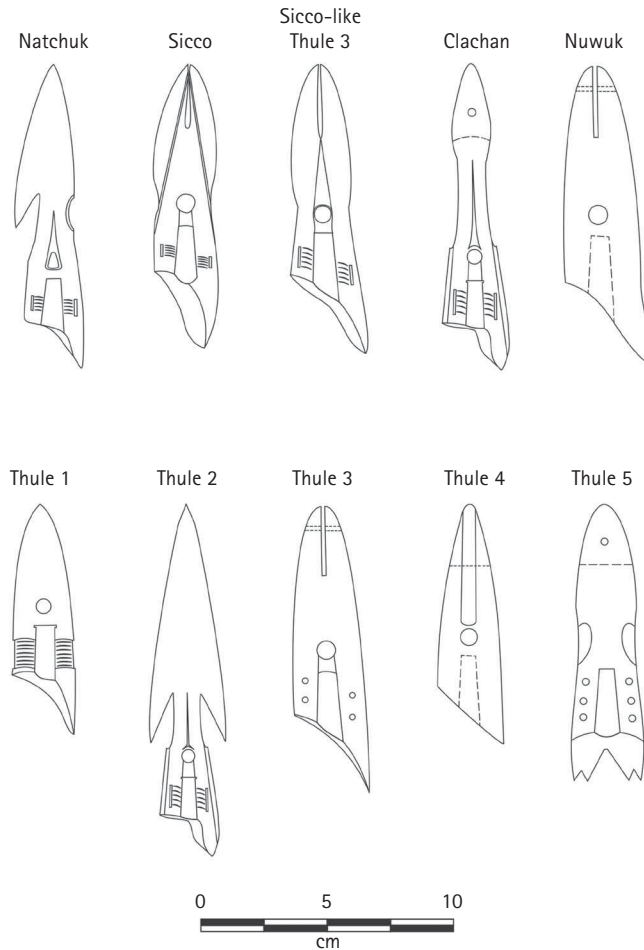


FIGURE 35.2 Principal precontact Inuit harpoon heads.

Illustration by Peter Whitridge

prongs whereas in later ones a rivet was often fixed through a hole drilled in the prongs and the end blade. Geometrically complex tangs, sometimes with decorative spurs, are replaced by simple conical ones. Raised lines, Y-motifs, residual side slots and other decorative flourishes on early Thule 2s and 3s (and characteristic of the early winged Sicco variant of the Thule 3) progressively disappear. Although there is a functional logic to some of these shifts (unadorned late Thule 3s with drilled lashing holes must have been much quicker to manufacture than Siccos), they represent not merely deletions of stylistic elements but also the positive adoption of a novel Shaker-like aesthetic that favored parsimony over ornament (late eighteenth- and early nineteenth-century Shaker material culture is distinctive for its self-conscious simplicity).

Some other varieties of material culture harbored similarly rich meanings and long-running technical histories. Bone, antler and ivory arrowheads were beautifully

manufactured and sparsely, but deliberately, ornamented, sometimes (especially in the Western Arctic) with ownership marks, and the conical tang for fixing the arrowhead in the wooden shaft evolved into an elegantly minimalist self-tapping screw. Needle cases were among the most intricate, symbolically laden objects in the toolkit. Often made of ivory, winged and decorated like the Sicco archetype of Eastern Arctic harpoon heads, they protected a leather strip into which needles were threaded when not in use. A toggle at one end functioned as (and resembled) a miniature drag handle that pulled the needles from their housing. At the other end a narrow, flattened hook held depilated sealskin thimbles—small leather triangles with a slit through which the tip of the thumb could pass (impressively, a design that is still in widespread use). The entire array evokes a seal being hauled up through its breathing hole. Clothing is unfortunately a rarity in Classic assemblages (e.g., McCullough 1989), although the negative castoffs from patterns were common on Qariaraqyuk house floors and provide evidence of both garment design and styles of hide preparation (Whitridge 1999a). Based on these assemblages, occasional finds like the clothed bodies from Qilakitsoq (Hansen et al. 1991) and Utqiagvik (Hall and Fullerton 1990), and historic evidence, precontact clothing technology and artistry are presumed to have been at least as sophisticated as for any other domain of Classic material culture and deserving of more concerted research.

As astonishing as the thought and labor that went into manufacturing this extraordinary range of objects is the apparent carelessness with which they were discarded. Recovered Classic assemblages are frequently large and diverse, and include not only the expected manufacturing refuse and badly damaged tools, but also unusual quantities of lightly damaged and apparently intact items. Two processes likely contribute to this phenomenon. In the first place, sod winter houses must have offered an ideal environment for object loss, in muck and snow. It was sometimes easier to lay new flagstone floors than clear frozen debris left over from the previous occupation (McGhee 1984). Second, many of the sites and features that shape our understanding of this period were abandoned in late Classic times, as part of the social, economic, and demographic reorganization attendant on the onset of the Little Ice Age. Items that might have been salvaged under normal conditions became *de facto* refuse (analogous processes likely account for the rich assemblages of complete or mostly complete objects at many Late Dorset sites). A third possibility, however, is that Classic households disposed of some equipment before it was clearly exhausted, for culturally idiosyncratic reasons. Certainly, the “tolerable deterioration” of material culture seems to have been exceptionally low. Perhaps the intensity of social interaction, and mutual evaluation, in larger communities fostered the accelerated renewal of personal gear; the currency of one’s clothing and equipment represented part of an ongoing social performance. A readiness to discard slightly used objects would in turn have promoted the economic overproduction realized through the sophisticated cooperative harvesting setups so characteristic of Classic communities (see below).

ECONOMY

Classic precontact Inuit life was organized around the schedule of game harvesting, many of the details of which can be assembled from zooarchaeological evidence, the harvesting gear itself, and ethnographic and ethnoarchaeological reports of more recent Inuit harvesting practices (Betts 2008; Savelle and McCartney 1988). After the fall whaling and caribou hunting season, people moved out of qarmat and into sod iglus. Early winter was a harvesting downtime, as sea ice gradually formed a stable platform for travel and sealing. Ringed seals scratch breathing holes (sing. aglu) in the thin early winter ice, especially along recently refrozen leads, maintaining them as the ice thickens throughout the winter (in zooarchaeological assemblages their osteoarthritic phalanges are a testament to this adaptation). Scanning the ice and the clouds for polynyas (in the latter case revealed as black patches reflecting open water below), reading the ice for recent leads, spotting the actual breathing holes, recognizing the subtle snow mounds that form over them, employing dogs to scent the holes, and inspecting and smelling them themselves to ensure they were still active, hunters identified suitable holes over which to watch and listen for a seal surfacing.

The hole would be cleared of slush and a mechanical or down indicator put in place, though the sound of bubbles breaking the surface might be enough to indicate a seal rising to breathe. The visual and auditory warnings gave the hunter time to raise the harpoon so that it could be slammed down at the correct moment (broken hands, incurred when the hunter contacted the icy dome that sometimes formed over the aglu, were reportedly common). The harpoon head toggled beneath the seal's skin, providing enough purchase for the seal to be held in place as the hunter chipped away the ice and then hauled its 60 kg carcass up onto the surface. Punctures in the seal's hide were closed with special wound pins to prevent the loss of edible blood, a thong strung through the jaw, and the seal dragged to the komatik or back to camp by a bone handle attached to the thong. In this manner the Eastern Arctic was made a habitable place; in a sampling of 18 Classic winter site faunal assemblages from Cape Parry to southeast Baffin Island (Whitridge 2001) small seals (the vast majority ringed) average 76.7 percent NISP (number of identified specimens), and sealing paraphernalia dominate the harvesting assemblages. Bearded seals could sometimes be taken in similar fashion, and walrus were taken at polynyas or the floe edge. Polar bears were hunted when they were encountered pursuing the same quarry, arctic foxes trapped in beehive-shaped cairns, and arctic char and lake trout fished through holes cut in lake ice. Caribou and muskoxen may occasionally have been pursued on their wintering ranges, but their declining fat levels over the winter made them progressively less attractive.

Late winter, as the sun returned and the sea ice continued to thicken, was the ideal season for breathing hole sealing and travel that ranged further from the iglu village. Ringed seal were likely pursued at greater removes from land at this time, as animals were hunted out of village neighborhoods. Dental annuli evidence suggests much more extensive late

winter or spring than early winter seal harvesting (Woollett et al. 2000). The historic pattern among some Central Arctic groups, of wintering in a series of snow house villages on the sea ice while pursuing ringed seal, must have originated in at least occasional Classic late winter practices. Coastal and inter-island travel, for hunting, social visiting, and trade, was greatly facilitated by the sea ice platform. Although regional groups were largely self-sufficient, a brisk trade was carried on in locally scarce or exotic commodities such as iron, copper, amber, ivory, and perhaps soapstone (and probably also perishables such as hides, oil, and wood). The residents of Qariaraqyuk, for instance, seem to have been heavily reliant for tool blades and bits on native copper and meteoritic iron obtained from sources several hundred kilometers distant (McCartney 1991; Whitridge 2002a).

In spring and early summer ringed seals move onto the sea ice to bask in groups next to the collapsing breathing holes, and historically were approached by crawling hunters who imitated seal sounds and movements. Migratory waterfowl (common eider, snow geese) returned in abundance in some areas. Char were occasionally fished as they left their wintering lakes, but their fat levels are low before a summer of feeding in the ocean. In late summer and early fall they gather at the mouths of streams, and then ascend them. This was the season for harvesting char at stone weirs. It was also the season during which caribou became most desirable, having fattened up and regrown a coat punctured by warble fly larvae in early summer. As they moved en masse from summer to winter ranges, kayakers armed with lances hunted caribou at water crossings, and archers intercepted them on land, sometimes deploying massive drive systems composed of regularly spaced stone inuksuit, with women and children beaters helping out (Brink 2005; Whitridge 2013). This was one of the most important annual harvests, since not only were stores of dried caribou put up, but the hides considered essential for winter clothing were obtained (Stenton 1991). Indeed, the full suite of caribou products—meat, fat, antler, bone, sinew, and hide—represented an essential component of precontact food and material culture.

Ringed seal and caribou, with regional complements such as walrus, beluga, harp seal, and muskox, represented the cornerstones of historic economy, but Classic precontact groups throughout the Eastern Arctic were distinguished by an organizationally complex effort to harvest bowhead whales, usually during summer and early fall as they migrated into and through their summering grounds. Bowheads were taken historically in North Alaska, Greenland, the Mackenzie Delta region and Labrador, and sporadically elsewhere, but before about A.D. 1450 were consistently and successfully pursued along the Central and High Arctic channels, in northern Hudson Bay and Hudson Strait, and around Baffin Bay and Davis Strait (Savelle and McCartney 1988, 1994; Whitridge 1999b). Savelle (2010) provides a conservative estimate of over 18,500 bowhead whales harvested by Inuit in the Eastern Arctic between A.D. 1200 and 1500. The ice-choked channels between Amundsen Gulf and northern Peel Sound, occupied by various Copper Inuit groups, and the Gulf of Boothia, may have been the only areas where resident Classic groups did not pursue bowheads. In other areas, communities and groups of communities launched umiaks manned by a seven- to eight-person crew, including paddlers, boat steerer, and harpooner. A streamlined boat crew of this size

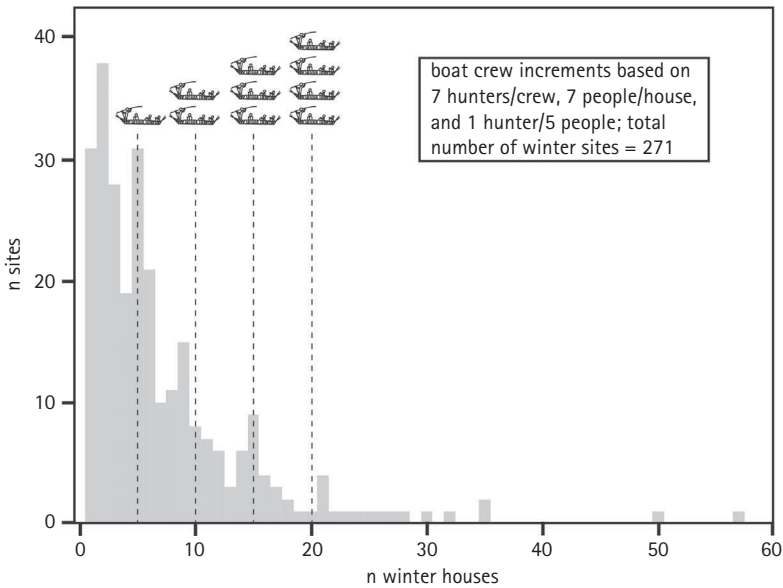


FIGURE 35.3 Precontact winter settlement sizes in the Canadian Eastern Arctic, with modes corresponding to increments of boatloads of hunters (Whitridge 1999a).

Illustration by Peter Whitridge

appears to be expressed in the modal sizes of winter settlements, which markedly peak at demographic increments corresponding to boatloads of hunters (Figure 35.3).

Whaling boat crews are well described ethnographically for North Alaska (Spencer 1959), where they have remained in operation up to the present, and are clearly (if schematically) depicted in Classic art (Maxwell 1983). An Alaskan-style organization based around an entrepreneurial boat captain (*umialik*) who assembled the equipment and crew, rewarding crew members with gifts and shares of the harvest (Sheehan 1985), appears also to have obtained in the Eastern Arctic (Whitridge 1999a, 2002b). Bowheads represented enormous packages of food, oil, baleen and bone: an 18–20 m adult bowhead might weigh over 60 tonnes, although the most avid Central Arctic groups successfully targeted primarily the smaller (~7 m) yearlings (Savelle and McCartney 1994). Meat and fuel generated by the bowhead harvest was cached in pits dug into gravel beaches, thousands of which dot the coastline of the “core” (Savelle and McCartney 1994) Central Arctic whaling zones. Whale bone was a key raw material for some groups, used for everything from the structural members of sod houses to the scores of varieties of small and medium-sized objects that fill their middens. Baleen was shaved into strips to use as a rugged cordage for house, boat, and komatik frames and a whipping for tool handles, and cut and stitched into more complex shapes, from drinking containers to sleds.

Whaling was potentially so rewarding that it created a distinct scheduling conflict with late summer or fall caribou hunting and char fishing in some areas. This conflict was resolved through thriving regional trade networks (Whitridge 2002a) and, likely, status-based divisions of harvesting effort within large communities (as amongst historic

Mackenzie Delta Inuit). The crystallization of a tightly interconnected social network throughout the Eastern Arctic in Classic times was arguably an effect of successful bowhead whaling; its winter sites (and probably total population) were larger than earlier or later ones, its material culture richer and more carefully realized. The insult to bowhead stocks and accessibility brought about by the deteriorating sea ice conditions of the Little Ice Age was catastrophic. Much of the Central and High Arctic was abandoned to year-round settlement, and even nonwhaling areas were impacted through the collapse of interregional trade. Some areas were newly colonized at this time, including the Barrenlands west of Hudson Bay, Labrador, and South and East Greenland. The Modified (or Postclassic) pre-contact Inuit world was substantially different from the Classic, and is largely recognizable as the one encountered by post-Norse Europeans in the sixteenth century.

SOCIAL LIFE AND BELIEF

Precontact social life played out through a nested series of networks corresponding to the tiers of the settlement system. Historically, the larger world was composed of Inuit—"people"—and various other human groups and nonhuman beings with whom the Inuit had more or less tense relations. Stories refer to both friendly interactions and conflicts with Tuniit (presumably Dorset), Norse, Gwich'in, Dene, Chipewyan, Innu, and other neighbors, and occasional evidence of interethnic violence occurs (e.g., at the fourteenth-century Saunaktuk site [Melbye and Fairegreave 1994]). Neighboring Inuit societies (and many precontact groups had only Inuit neighbors) likely feuded and raided to some extent as well, but the widespread evidence of substantial long-distance exchange implies maintenance of the sorts of extended social ties that are attested in many areas historically, such as the formal exchange partnerships that were activated during trade fairs in Alaska (Burch 1988) or the spouse sharing arrangements that occurred throughout the Inuit world.

At the regional level, contemporaneous winter villages sometimes occur within sight of each other, such as the Somerset Island communities that faced each other across Hazard Inlet, southern Creswell Bay, and Aston Bay (Savelle 1987). These and other settlement clusters were undoubtedly in frequent close contact, joining forces in bowhead whaling and caribou drives, participating in each other's feasts, festivals, and shamanic performances, and forming close bonds based on marriage, blood relation, and friendship. The largest communities must have sustained an internal social dynamic comparable to that of the networks of smaller settlements in economically marginal areas, as suggested by the former's spatial compartmentalization into neighborhoods composed of closely spaced or adjoining house clusters (likely equivalent to the Alaskan *upsiksui*), as at PaJs-4 (Savelle and Wenzel 2003). Large winter and late summer or fall villages represent the periodic aggregation of local groups that dispersed at other times (e.g., for summer fishing) into smaller kin groups of varying sizes, from individual households to extended family household clusters. An archaeological challenge in interpreting the larger aggregations is

assessing the extent of houses' occupational contemporaneity (Park 1997). Although arguments about community size can be advanced on the basis of such things as radiometric dates, artifact styles, site structure, and whaling success (e.g., Whitridge 1999a), their confirmation perhaps awaits more extensive sampling and finer-resolution dating.

A distinctive feature of Classic and later precontact sites is the occurrence of large structures with a paved floor and encircling stone bench, either in direct association with individual house clusters (Friesen and Stewart 1994; Habu and Savelle 1994; McCullough 1989; Savelle 1987; Whitridge 1999a) or at a less partisan remove from residences (Savelle and Wenzel 2003). These were clearly communal gathering places, but in an important respect many resemble the qariyit of North Alaska more than the dance or festival houses of historic Central Arctic groups. The former were used not only for periodic community celebrations and shamanic rites but also for daily work and socializing by men. The combination of ornaments, ritual paraphernalia, and dense accumulations of wood- and bone-working debitage at a Classic qargi bears out this dual usage (Whitridge 2004a). Large communities housed multiple qariyit, typically in association with house clusters, implying their construction and maintenance by the most powerful kin groups. An informative exception to this pattern is the singular, topographically elevated qargi at PaJs-4, which seems to signal a symbolic effacement of the partisan kin blocs that are reflected in the site's discrete qarmat clusters.

Qariyit arguably evince the important economic, social, and ritual roles of male hunters, constituting a space to which women may have had only partial access. On the other hand, while the domestic residence was shared between women and men, it was the principal locus of women's indoor activity (clothing manufacture, food preparation, child care), and hence a space over which they exercised practical and symbolic mastery (Whitridge 2004a). Indeed, a progressive feminization of household space unfolded over several hundred years, as the external kitchen of early Classic winter dwellings was drawn to the edge of the living floor, and then into the center—both literal and figurative—of everyday house life (Whitridge 2008).

Just as gendered activities were segregated in time-space, women and men utilized distinct toolkits for everyday tasks, as evinced most iconically by the ulu (women's knife) and sapik (men's knife). It is not surprising then that distinctly gendered forms of symbolic practice are recognizable in women's and men's material culture. In particular, depictions of the human form, which are rare in Classic art and design, fall into two distinct camps. Complex representations of (mostly) harvesting activities with schematic stick figures, sometimes assembled into composite designs that must be read from multiple perspectives, as well as three-dimensional representations of animals or animal parts, occur on everyday equipment used by men (drill bows, knife handles, harpoon toggles, etc.). Three-dimensional representations of the human form, however, are mostly of women. These include a distinct variety of bead or pendant consisting of one or more female figures standing atop a cylindrical bead (where multiple figures occur, the women are joined arm in arm in collegial rows), simple ivory figurines with female bodies, a flat-bottomed ivory figurine with a bird's body and woman's head and shoulders (used in the game of tingmiujaq), and the ubiquitous wooden doll (a girl's plaything that usually depicts

girls, although infants and adult women and men also occur). Whoever manufactured the objects, women and men were represented in distinct material settings using distinct graphical idioms. It would be rewarding to explore the discursive undercurrents of clothing manufacture, as a genre peculiar to women (Hansen et al. 1991 outline an elaborate symbolic vocabulary for the complete garments that clothed the Qilakitsoq mummies). In any case, contrasting realms of belief and ritual practice are implied, with women's sphere centered on the family dwelling and served by portable sculptures of women, and men's centered on the qargi and bound up with the pursuit of game.

Kin and gender groups are perhaps the most striking and archaeologically accessible social categories, but others can be recognized. The role of shaman or angagok was at the core of ritual practice before the widespread conversion to Christianity that began in the late eighteenth century, and represented a distinctive social persona. Miniature weapons occur like those that adorned historic angagoks' amulet belts, as well as suggestions of more widespread protective magic in the form of amulet straps (which held amulets next to the wearer's person) depicted on some dolls. The latter also implicate angagoks, who made and sold personal amulets historically (Spencer 1959). Curved wooden and baleen bands interpreted as drum rims, with a central groove for the cord that held the drum head tight, as well as plausible batons for striking the rim, suggest the drum dancing and singing that accompanied both shamanic practice and performances by non-angagoks.

Childhood and old age represent distinct moments of the life course that were variously marked and named ethnographically. Miniature tools (Park 1998), simple wooden animal figurines, games (hopping stones, playhouses, boat outlines), and toys (buzzes, tops, and pierced seal bones used for *ajaggaq*, the Inuit cup-and-pin game) point to children's play, enskilment, and socialization into adult activities, and clothing points to a sartorial discourse that enveloped children's bodies. Two-dimensional depictions on drill bows sometimes show diminutive figures who must be children, as well as individuals with bent backs walking with canes, who are presumably elderly, and whose lifetimes of hunting, boating, sledding, and clothing manufacture are reflected bioarchaeologically in distinctive patterns of osteoarthritis (Merbs 1983) and dental wear (Hansen et al. 1991). The material evidence exists to support archaeologies of a wide variety of precontact Inuit social roles and identities (Whitridge 2010).

CONCLUSION

Understanding the transformations of Inuit society during the past 450 years of intensive interaction with Europeans depends on a fuller understanding of the Classic precontact archaeological baseline. Archaeologists sometimes seem to imagine contact between indigenous groups and Europeans as a momentary encounter that precipitated wholesale cultural change, like a Midas touch that instantly and irrevocably transformed the world, but this was not the case. Northern Europeans (Norse) occupied the

northeastern margin of North America for almost 500 years to relatively minor effect on the Classic and later Inuit groups who encountered them, and eventually were themselves out-competed by Inuit as the latter expanded into southwest Greenland in the fourteenth and fifteenth centuries. Elsewhere in northern North America, post-Norse European exploration, economic exploitation, and settlement were piecemeal before the twentieth century. Rather than a world-defining event horizon, Inuit-European contact was a slow, erratic progress that touched different Inuit groups at different times to differing effect. While our understanding of the historic period is muddled by a complex contact history and a patchy (and poorly explored) archaeological record, the Classic precontact episode stands out as a startlingly vivid cultural florescence in the Eastern Arctic. The scale of settlement, harvesting activity, interregional trade, social differentiation, technological complexity, and (arguably) aesthetic accomplishment was unequaled before or afterwards, and remains archaeologically accessible thanks to a superbly well-preserved record.

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CHAPTER 36

LABRADOR INUIT

Thriving on the Periphery of the Inuit World

SUSAN A. KAPLAN AND JAMES M. WOOLLETT

INTRODUCTION

WHEN Thule groups migrated into Labrador around the fifteenth century, they settled in a part of the north peripheral to the rest of the Arctic, away from the well-traveled migration routes of their cousins. Labrador was at the margins of the Thule world; however, the migrants did not settle into a marginal environment. In fact, their new home provided them ready access to an unprecedented diversity and wealth of marine and terrestrial resources, resources that by the eighteenth century supported large Inuit communities.

Within a short period of time, the Thule migrants occupied much of the eastern Labrador coast and their communities thrived. By the late sixteenth century, they were aware that strangers with desirable materials such as metal were coming to southern Labrador's shores, even if many had not met the foreigners face to face. The Labrador Inuit¹ interacted directly with a number of European groups over the course of the next 400 years. They traded with these strangers, becoming involved in North Atlantic trade networks that linked them with distant markets. Trade presented the Labrador Inuit with a variety of opportunities and challenges while they continued to successfully exploit Labrador's many natural resources.

The move into Labrador isolated the newcomers from their northern relatives, whereas the new Labrador residents' interactions with the Western world intensified over time. Judging by the size and contents of sites, the Inuit enjoyed a great deal of success during the eighteenth century, even as the climate of the region began to cool. They learned to exploit the Labrador's rich but variable terrestrial and marine environments and the complex contact situation, elaborating aspects of their culture, while continuing to employ many of the technologies and subsistence strategies of their Thule ancestors.

ENVIRONMENTAL AND GEOGRAPHICAL CHARACTERISTICS

Labrador in Relation to the Rest of the Canadian Arctic

The Quebec-Labrador Peninsula defines the northeastern boundary of mainland North America. Baffin Island lies to the north, Greenland to the east, Newfoundland to the south of this “Big Land” (*Nunatsuak*). The area is somewhat isolated from the rest of the Arctic by its location and geography, and is only indirectly connected to travel routes extending from Alaska to Greenland. Travel from Baffin to Labrador requires traversing the treacherous waters of Hudson Strait. Access from the west, via Ungava Bay is not much easier. Thule groups living in what is now Nunavik, on the Ungava side of the peninsula, were the Labrador migrants’ closest Inuit neighbors. When these groups visited one another they probably traveled around the tip of Labrador or through a handful of passes that bridge the western and mountainous eastern coasts of the peninsula.

In contrast, Labrador is readily accessed from the south (both from the Strait of Belle Isle and the continental interior) and, with proper vessels, from the east (the North Atlantic). Southern Labrador, the Gulf of St. Lawrence, and what are now the Maritime Provinces of Canada supported a number of indigenous Native Americans and Euroamericans and provided many opportunities for cultural exchanges. Especially after the beginning of the seventeenth century, Inuit in Labrador had regular access to social and economic networks originating across the North Atlantic that had few parallels in the North American Arctic.

Environmental Characteristics Affecting Life in Labrador

As a landmass whose major axis runs north-south, Labrador cross-cuts a series of climatic and ecological zones. Labrador’s climate is regulated by its proximity to marine currents and major systems of atmospheric circulation in the North Atlantic and Arctic, influences that render Labrador exceptionally cold for its latitude. The northern third of Labrador, from the Nain region to Killinek, has an Arctic climatic regime, as defined by maximum mean monthly temperatures of less than 10° C and short summers with less than 70 frost-free days. The coast south of Nain is somewhat warmer (70 to 110 frost-free days) and wetter, while the interior as far south as Hamilton Inlet has a more continental subarctic climate, with fewer than 90 frost-free days. The inner reaches of Hamilton Inlet have a very continental climate and are warmer, with up to 110 frost-free days (McManus and Wood 1991:Plate 6).

The single most important environmental factor influencing Labrador is the Labrador Current, a major conveyor of Arctic Ocean water. This current carries cold (0–3° C) and low-salinity waters southward along the Labrador coast. The current chills Labrador’s coastal waters and shores and figures prominently in the transport of pack ice to the coast from Davis Strait and regions further north.

Processes of atmospheric circulation also influence Labrador's climate. Labrador is located between the Arctic and Polar Fronts, variations in the strength of Arctic air circulation displace these fronts north and south, both seasonally and interannually, with impacts on Labrador's landmass (Serreze and Barry 2005). From fall to spring, atmospheric circulation patterns in the North Atlantic are dominated primarily by a strong low-pressure system in the region of Iceland (the "Icelandic Low") that draws cold northerly to northeasterly winds from Greenland to Labrador. Low-pressure systems located in the eastern Labrador Sea, which are also common, bring cold north and northwest winds to Labrador. In summer and fall, predominant high-pressure systems in the warm mid-Atlantic and low-pressure systems northwest of Labrador bring warm prevailing winds from the south and southwest (Newell 1996); these winds are instrumental in the break-up and dispersion of sea ice in spring. Variations in the location and strength of these circulation systems (such as the North Atlantic Oscillation, or NAO) influence the intensity and duration of Labrador's seasons and the timing of the formation and clearance of sea ice. In particular, the positive mode of the NAO (deepened low pressure in the Icelandic Low) produces stronger northerly to northeasterly winds in Labrador, colder temperatures, a prolonged sea-ice season, and increased pack-ice transport (Newell 1990).

The climatic linkages of Labrador to the Arctic are most clear in winter, when the Arctic Front dominates the region's climate and Labrador's coastline is completely bound in landfast sea ice. However, unlike regions of the Central and High Arctic, there is no local multiyear ice in Labrador; the coast is completely ice-free in summer and fall when the cold Arctic air masses are replaced by warmer air masses from the south and southwest.

Landfast ice begins to develop in northern Labrador's protected coastal waters in November and in southern Labrador a month later. It typically forms a sheet up to 1 to 2 m thick and lasts until solar radiation and prevailing southerly winds melt the ice and push it offshore. Attrition of fast ice begins in late May along the north coast, with full clearance by mid to late June. In southern Labrador attrition can begin in April and full clearance occurs in mid-May to June. Landfast ice extends from 4 to 30 km from the mainland shore along large parts of the Labrador coast, particularly along portions of the coast protected by chains of offshore islands. There is little fast-ice development around capes, headlands, and exposed mountainous shores (AES 1992; CIS 2001, 2002; Skidmore 1979).

A handful of recurrent biologically productive open-water areas (polynyas) appear amid fast ice. The most notable are in McLellan Strait at Labrador's northernmost tip (a polynya driven by tidal currents), in Nachvak Fjord (a wind- and tide-driven polynya), and in the Narrows of Hamilton Inlet (a strait normally swept clean of ice by strong tidal currents, which can be enclosed by wind-driven pack ice). Polynyas, rattles (small open-water areas in constricted waterways dominated by strong currents), and the sina (the juncture of fast ice and open water) are important to animals and people.

Ecosystems along Labrador's North-South Expanse

Fjords, islands, and a mountainous interior that rises onto a vast plateau characterize Labrador's northern quarter. Permafrost and frozen ground are widespread, and the

region is dominated by arctic and alpine tundra. Lichen heath, sedge meadows, sphagnum bogs, and woody shrubs grow in poorly developed soils.

Subarctic tundra and subarctic coastal tundra dominate Labrador's central half, a region marked by fjords, bays, and offshore islands. More diverse plant communities with a more concentrated biomass are found in these areas than further north, the growing season is longer, and permafrost is more discontinuous. Patches of open white spruce and larch woodland grow in the continental interior reaches of Hebron and Napaktok fjords, and in sheltered niches on the otherwise barren coast where krummholz spruce trees (environmentally stressed and stunted trees) are common, along with birch and other woody shrubs, heath, and peat bogs. Spruce and larch forests become continuous and dense in the large valley systems of Okak Bay, the Nain region, and further south, where they extend to the edge of the open coast.

The southern quarter of the coast is dominated by a variety of continental mid-subarctic, low subarctic, and boreal ecosystems, characterized by closed canopy forests of black spruce, larch, jack pine, balsam fir, white birch, and trembling aspen, as well as upland string bogs. These diversified forest ecosystems are widespread along the bays and deep waterway of Hamilton Inlet, except along the exposed Labrador Sea coastline, where coastal barrens prevail.

Labrador is inhabited by a diversity of terrestrial and marine mammals, birds, and fish. Animal population sizes and distributions are quite dynamic, a result of seasonal variations, species' individual ecological needs and cycles, local ecological conditions along the peninsula's north-south expanse, and a changing climate.

Seasonal visitors include migratory birds flying north to nest in Labrador and the High Arctic. Bowhead whales appear in the fall and harp seals swim through Labrador waters in the fall and spring. Walrus and polar bears inhabit the region during the colder months. Some terrestrial animals are prone to dramatic population fluctuations that are either cyclical (lemmings for instance) or the result of adverse climate conditions (such as heavy spring icing that can cause starvation among caribou unable to reach vegetation).

Analyses of individual fjords, bays, and archipelagos (see Brice-Bennett 1977; Cox 1977; Fitzhugh 1972; Kaplan 1983; Williamson 1997) have revealed variations in distributions of types and numbers of animals inhabiting regions of Labrador due to local geographic and ecological conditions. The Killinek region, with its polynya, strong currents, and offshore islands, is frequented by large numbers and varieties of seals, whales, and fish, as well as walrus and polar bears, drawn to the area by nutrient-rich upwelling waters. Birds are attracted here by those same waters and fox-free islands that are safe nesting grounds. Ramah Bay, an exposed and mountainous stretch of coast, can support only small, transient populations of marine and terrestrial mammals due to limited vegetation, little shelter from winds, and an unstable fast-ice cover. Okak, with extensive waterways sheltered by islands and a wooded coastline, supports a diversity of animals: those attracted to the open bay and offshore islands (bowhead whales, walrus, seals, birds) and the sina (birds and marine mammals), those dependent on fast ice (ringed seals and polar bears), and those living on the tundra or within the tree line (caribou, black bears, wolves, fox, arctic hare, porcupine). Hamilton Inlet, with a temperate

environment and protected estuarine waterway, supports caribou, seals, fish, birds, black bears, and furbearing animals.

Economically, marine mammals have been the most important prey for Inuit. The stability and location of fast ice and pack ice affect the distribution of most of these animals. The strength, temperature, and salinity of the Labrador Current also play a part in marine mammal distributions, affecting not only fast ice development, but also the distribution of fish and other marine organisms on which the animals feed.

Four of the six species of seals found in Labrador and the bowhead whale have been critical to the Inuit diet. Harbor seals (*Phoca vitulina*) frequent temperate open-water areas. They are most common in Hopedale, Hamilton Inlet, and Sandwich Bay (Ames 1977:Map 103) and tend to move from the inner coast to open water beyond the sina.

Harp seals (*Phoca groenlandica*) breed off the Newfoundland coast and are seasonal visitors to Labrador. Vast numbers migrate through the area in the spring, staying offshore, en route to their summering grounds further north. Between September and December they venture south into Labrador's bays and islands to eat fish (Sergeant 1991:101).

Ringed seals (*Phoca hispida*) stay in Labrador year round. They are most common where winter-spring fast-ice conditions are stable (Boles et al. 1980:20). They especially like the north coast's protected fjords, the archipelagos of Nain and Hopedale, and Hamilton Inlet and Sandwich Bay. Females raise their young in dens dug into fast ice. Adults linger in fast ice and at the sina in the winter and spring. During open-water seasons they move to outer islands and bays (Smith 1973).

Bearded seals (*Erignatus barbatus*) favor pack-ice-laden waters and the sina. They can be found along the Torngat coast, outer islands of the Nain, Okak, Hopedale areas, and the ice edge within Groswater Bay (Katona et al. 1993).

Toothed and baleen whales frequent Labrador waters, the bowhead (*Balaena mysticetus*) being the most important to Inuit. Bowheads arrive in Labrador in October and November, moving from the Davis Strait region to the Strait of Belle Isle (Moore and Reeves 1993:361). They feed around the mouths of north-coast fjords and north- and central-coast bays.

As a consequence of Labrador's north-south expanse, complex geography, the Labrador Current, and the position of the Arctic and Polar fronts, Labrador's environment is highly variable seasonally and interannually, resulting in a dynamic situation for animals in the area and the humans relying on them. For instance, during periods of climatic cooling, open-water-loving species such as harbor seals will stay south of ice-choked waters and harp seals will stay offshore. However, ringed seals and bearded seals will extend their territory south to take advantage of expanding and stable fast ice and pack ice. The converse is true during warming periods, and there is rarely a time when Labrador's coastal waters are devoid of animals. However, during stormy seasons fast ice is eroded away and coastal waters become turbulent. Large amounts of snow can fall or spring rains can create dangerous icing conditions. Storms can destroy animal habitats or impede movement, and also create problems for hunters who can sometimes see but not reach their prey (Kaplan 1983:213).

MAJOR TRENDS IN LABRADOR INUIT CULTURE ARCHAEOLOGICAL RESEARCH

Junius Bird was the first professional archaeologist to publish a report based on Labrador archaeological fieldwork. In 1934, he excavated sod houses in the Hopedale area (Bird 1945) and began a discussion regarding the reasons for changing Labrador Inuit sod house dimensions. While people explored Labrador in the ensuing 30 years, it was not until the late 1960s that professional archaeologists began sustained work in Labrador. William Fitzhugh surveyed Hamilton Inlet (Fitzhugh 1972), Jim Tuck investigated Saglek (Tuck 1975), Patrick Plumet worked in Ungava and northern Labrador (Plumet 1979; Plumet and Gangloff 1991), and Steven Cox excavated in Okak (Cox 1977). The surveys led to excavations of sod houses in Saglek (Schledermann 1972, 1976a, 1976b) and on Eskimo Island, in Hamilton Inlet (Jordan 1974, 1977, 1978). During this time, J. Garth Taylor published an influential cultural ecology study of eighteenth-century Labrador Inuit (Taylor 1974) based on analyses of Moravian missionary records. These studies prompted discussions about Inuit responses to climate change and contact with Europeans. In particular, researchers debated reasons for the eighteenth-century Inuit adoption of large semisubterranean structures with multiple sleeping platforms (known as communal houses), the development of long-distance trade networks, and the emergence of influential men presiding over large households and involved in the long-distance trade. These discussions continue today (Kaplan and Woollett 2000; Richling 1993; Woollett 2003, 2007).

In 1977 and 1978, Fitzhugh and Richard Jordan directed the Torngat Archaeological Project (TAP), a multiyear survey initiative that resulted in locating, mapping, and testing hundreds of archaeological sites from Nain to the Button Islands. At the same time, Carol Brice-Bennett published *Our Footprints Are Everywhere*, a volume that reported in detail on Inuit knowledge and use of the central and north coast (Brice-Bennett 1977). Susan Kaplan used TAP archaeological data, land-use studies, environmental information, and ethnohistorical documents to construct a detailed culture history of Inuit occupations of the north and central coast. This work examined Thule/Inuit changing subsistence and settlement patterns and adaptive strategies in the face of environmental and geographical factors, and culture contact situations (Kaplan 1983).

During the 1980s, 1990s, and early 2000s, focused archaeological surveys and excavations took place throughout Labrador (Auger 1985, 1989, 1991; Auger and Stopp 1989; Hood 2008; Fitzhugh 1981, 1989, 1994; Kaplan 1985a, 2009; Kaplan and Woollett 2000; Loring and Arendt 2009; McAleese 1989; Stopp 2002; Thomson 1986, and see the *Annual Reports* and *Newsletters* issued by the Provincial Archaeology Office, Government of Newfoundland and Labrador [<http://www.tcr.gov.nl.ca/tcr/publications/index.html#Newsletters>]). Also in the late 1990s, Kaplan initiated a multiyear excavation at Uivak Point-1, a communal-house site in the Okak region in order to understand what an eighteenth-century economy looked like archaeologically. James Woollett undertook the analysis of faunal remains recovered from the site. Their work expanded to include Oakes Bay-1, an eighteenth-century

sod house site on Dog Island in the Nain region. In addition to pioneering the use of dendrochronology as a tool for dating Labrador sod houses (D'Arrigo et al. 2003; Kaplan 1997, 2009; Woollett 2003), they supported entomological and archaeobotanic analyses of sod house and midden deposits (Bain 2000; Woollett 2003; Zutter 2009). Their multidisciplinary work, employing cultural ecology, historical ecology, and environmental archaeology theories and methods, examined issues of environmental change and culture contact. Current research that is examining Inuit use of terrestrial resources and alteration of landscapes around sod houses developed out of this work (Lemus-Lauzon et al. 2012).

Today, researchers are using archaeology to address questions having to do with a range of social and economic processes and climate change. For instance, Melanie Cabak (1991) has examined the role of women in nineteenth-century Labrador Inuit society, Lindsey Swinarton (2008) has explored Inuit attitudes toward animals, Stephen Loring and Beatrix Arendt (2009) have studied Inuit-Moravian relations at Hebron, Amelia Fay (2011) is investigating a sod house linked to Mikak, a prominent eighteenth-century Inuk woman, Lisa Rankin and colleagues are studying southern Labrador acculturation processes (Beaudoin et al. 2010), and Natalie Gaudreau (2011) has explored using Western and Inuit animal butchery patterns as a technique to identify the cultural affiliation of inhabitants of sod houses.

CURRENT UNDERSTANDING OF LABRADOR INUIT ADAPTATIONS

Thule Migrants

The initial Thule occupation of northern Labrador is not well dated. Few sites have been excavated and as a consequence there is a paucity of radiocarbon dates and stylistically diagnostic artifacts to analyze and study. Researchers have proposed different scenarios as to the timing of the migration. Whether the newcomers traveled directly from Baffin Island or from areas further west is not known. Peter Whitridge (2008:297) associates the pioneers with a Modified Thule tradition and suggests a mid- to late fifteenth-century date of settlement. Fitzhugh (1994) dates the Thule arrival in northernmost Labrador to the late thirteenth century A.D., a date that corresponds to dates of initial Thule settlements in Nunavik. Peter Ramsden and Lisa Rankin (2013) discount all north-coast dates on wood charcoal, arguing that north-coast residents must have burnt driftwood, which would skew dates. Using southern Labrador dates run on antler, they argue a late fifteenth- or even early sixteenth-century occupation of the region and no “precontact” Thule occupation of the coast. Their study ignores the presence of living forests easily accessible to north-coast residents, but highlights the need for better dating methods and studies of driftwood deposition patterns. North and central coast dates suggest that certainly by the fifteenth century A.D., Thule settlements were widespread in Labrador, extending at least as far south as the Nain region (Kaplan 1997:183).

Late Dorset and Late Indian Point Revenge groups lived in Labrador before the Thule arrived. Archaeologists continue to be tantalized by the question of whether Thule, Late Dorset, and Point Revenge people met (Fitzhugh 1985, 1994; Loring 1989; McGhee 1997; Park 1993; Plumet 1979).

Thule-style artifacts found in sod houses and middens reveal that the newcomers arrived equipped with sophisticated technologies similar to those used by Thule in other regions. The newcomers had implements with which to hunt, gather, process foods and skins, and make shelters. They were ready to hunt and travel over land, through open water, and on the sea ice; all conditions they encountered in Labrador.

Fine-grained ground and drilled slate blades found in Thule deposits in north-coast sites suggest that the first Thule families brought their implements with them to Labrador (Higdon 2008; Kaplan 1985b:50). Spent implements were replaced with blades fashioned from coarse-grained Labrador slates, suggesting that relatively quickly Thule began exploiting local resources.

The newcomers had to adjust to mountain ranges that to some extent limited coastal movements in a north-south direction. Also, they had to learn about seasonal variations that required lateral movements (interior; inner fjords, bays, and islands; outer islands; and the sina).

The abundance and variety of vegetation and the forest in particular, growing as far north as Napaktok Bay, would have been unfamiliar to these northerners. Initially, they probably entered the forests to cut wood for specific purposes, but most likely did not linger long to avoid meeting Native American groups frequenting the forest and being exposed to spiritual dangers possibly manifested as forest-dwelling insects and worms (Burch 1971; Kaplan 2012; Laugrand and Oosten 2010).

The Thule migrants built small, 4 m by 6 m oval to rectangular, or bilobed semisubterranean sod houses similar to those used by their cousins further north. They settled on far outer islands and outer sections of fjords and bays near the sina, and by polynyas, where they spent late fall, winter, and part of the spring. These locations placed the Inuit close to familiar types of productive hunting locations and provided some distance from forests and associated spiritual dangers (Kaplan 2012). For instance, they built sod houses on the southern shore of McLelan Strait, adjacent to its polynya, on the southeastern tip of Rose Island, close to stable fast-ice and the sina, and on the north shore of Nachvak Fjord, overlooking its polynya. Sod house clusters from this period have been located on outer islands such as Staffe Island in northern Labrador, Green Island and Okak Island (Kivalekh) in the Okak region, and Iglosiatik Island in outer Voisey's Bay. Ground and drilled slate and nephrite implements found at Johannes Point-1, on the north shore of Hebron (Kaplan 1983:576–594), and ground and drilled slate endblades, snow knives, and soapstone pots with raised wick stands recovered from Avertok deposits in Hopedale (Bird 1945) suggest Thule occupied these places as well.

Due to a lack of extensive investigations of Thule middens and poor preservation, we can talk about Thule subsistence practices only in general terms. Sites on Iglosiatik Island and Staffe Island have produced remains of polar bears, walrus, and ringed seals. Excavations at Nachvak Village have yielded a full sweep of large and small terrestrial

and marine animals (Swinarton 2008). Work at Nunaingok-1 and Nachvak Village has produced baleen and bones of large whales, indicating that Labrador Thule people hunted large marine mammals when they were available. Other animals, including belugas and ringed, harbor, bearded, and harp seals, and birds were also part of their diet (Woollett 1991). The artifacts, faunal remains, and site locations reveal the continuation of the Thule propensity and ability to hunt a range of terrestrial and marine animals in a variety of environmental contexts.

Challenges and Choices Labrador Inuit Faced

The Inuit continued their exploration of the coast throughout the 1600s, venturing into southern Labrador as is evident by sod house sites dating to the 1600s in Hamilton Inlet (Jordan 1978), the Sandwich Bay region (Brewster 2008; Fitzhugh 1989; Rankin 2010:336; Rankin et al. 2012), and the Quebec Lower North Shore (Fitzhugh 2011; also see Kennedy 2009; Stopp 2002, 2008).

They appear to have been attracted south by hunting opportunities (Trudel 1978, 1980) and by knowledge of the existence of exotic objects brought to the New World by Basque whalers who began to frequent southern Labrador around the time the Inuit were moving down the coast (Barkham 1977, 1978, 1980; Logan and Tuck 1990). Initially Inuit probably happened upon discarded or cached Basque materials (metals, hardwoods, roofing tiles, glass and ceramic sherds, etc.) before coming face to face with the strangers. Eskimo Island-3 reveals that the seventeenth-century Inuit understood the usefulness of these new materials and added many to their technology repertoire. They adopted Western-made metal fishhooks and lead sinkers, while cold hammering large spikes into harpoon heads and fashioning fragments of roofing tiles into whetstones. Iron soon replaced ground slate and the stage was set for the development of extensive eighteenth century north-south trade networks.

Between the late 1500s and mid-1800s, Labrador Inuit dealt with a variety of European groups who visited Labrador. In addition to the Basque, Dutch traders plied Labrador waters around the 1600s (Kupp and Hart 1976). They have not been identified archaeologically, but would have added to the number of exotic goods entering Inuit exchange systems and the instances of Inuit-European face-to-face encounters. By the early eighteenth century, French and British seasonal fishermen and traders visited Labrador's shores and some settled in southern Labrador, where they operated concessions (Stopp 2008; Trudel 1978). Moravian missionaries entered onto the scene in 1752, establishing their first successful settlement in Nain in 1771 (Hiller 1971, 2009; Rollmann 2009; Whiteley 1964). The first European group to live alongside north-coast residents, the Moravians sought to convert Inuit and used trading posts to attract them to the mission stations. In the nineteenth century the Hudson's Bay Company (HBC) established a post in Hamilton Inlet in direct competition with year-round trading establishments in the area. This set the stage for Moravian and HBC competition for Inuit loyalties beginning in the 1870s, as mission stations and trading posts were built in a leap-frog fashion along

the north coast. These establishments' demands on Inuit, the collapse of the baleen trade and long-distance trade networks, and missionary successes at converting Inuit profoundly disrupted Inuit society and resulted in settlement dispersals and social fragmentation by the nineteenth century (Kaplan 1983:360–374).

Forms of Inuit-European Relationships in the Eighteenth Century

In the 1980s researchers disagreed about the timing and character of an Inuit presence south of Hamilton Inlet (Auger 1989; Martijn and Clermont 1980). Auger excavated sod houses in the Strait of Belle Isle and Chateau Bay region in an effort to identify the ethnic makeup of the households. His work highlighted the difficulty of using archaeology to establish cultural identities of inhabitants of contact-period sod houses.

Currently, archaeologists working in southern Labrador are trying to tease out how to use archaeology and ethnohistory to address questions of the ethnicity and cultural identity of sod house occupants. These efforts will lead to a better understanding of southern Labrador's Inuit culture history and provide information on the variety of acculturation processes adopted by different groups of Inuit (Beaudoin et al. 2010; Fitzhugh 2011; Murphy 2011; Rankin 2010, Rankin et al. 2012; Stopp and Wolfe 2011).

By the 1700s, individual Inuit and Inuit groups had developed a variety of relationships with and postures toward the Europeans in the south. Documents suggest a group of Inuit from Avertok stopped whaling in the 1600s and 1700s, and went to Hamilton Inlet to become traders, moving native-produced goods south and Western goods north (Kennedy 2009:29; Taylor 1974:8). Men on the north coast also entered the long-distance trade arena. Some became influential long-distance traders who traveled the length of the coast, others stockpiled baleen in particular, which they traded to the long-distance traders for Western-made goods. Once mission stations were established, some north-coast Inuit took their trade to the station traders, though initially the mission would not deal in rifles. The lure of acquiring Western goods, and rifles in particular, was so great that groups of north- and central-coast Inuit undertook trade voyages that could last two or more years (Rollmann 2011).

Once south, some Inuit traded by day and stole valuable goods (including sloops) by night, which resulted in fierce altercations with Europeans awakened to the thefts. Some Inuit established themselves in the south, became bilingual (such as the Inuk Sequilla), and worked as intermediaries or translators between the Europeans and northern traders (Kaplan and Woollett 2000; Kennedy 2009; Taylor 1974). Many Inuit lost their lives on the long-distance voyages, in altercations with Westerners, and as a result of communicable diseases (Richling 1993). The variety of relationships is known ethnohistorically; specific archaeological signatures of these relationships have yet to be defined.

Taylor has discussed the importance of the trade in baleen. By participating in this trade, Inuit became part of a world trade system. Interestingly, the lucrative trade networks of the eighteenth-century Labrador Inuit did not extended north or west outside the peninsula. Rather, Labrador Inuit were linked to distant Western ports and economies, and a number of them made voyages across the ocean (Lutz 2005; Stopp

2009; Taylor 1976, 1983, 1984). When the baleen market collapsed in the 1790s, the long-distance trade networks in Labrador foundered.

Growth and/or Concentration of the Inuit Population

In the 1600s, Louis Jolliet described seeing Inuit living in large semisubterranean houses (Kennedy 2009:30), and by the 1700s these structures were used throughout the region. The houses were erected in inner bays and islands; many of the Thule outer island sites were abandoned (Kaplan 1983). Communal houses had two or three sleeping platforms and were occupied by multiple families related to one another. A house might include a father, his sons, and their wives (men often had multiple wives) and children. In many cases, the head of the family was involved in the long-distance trade. Powerful men, such as Millugak, Tuglavina, Sikkuliak, and Mitsuk, emerged, some combining the roles of shaman, household head, and trader or entrepreneur (Kaplan and Woollett 2000; Taylor 1974:81, 1979).

The change in settlement locations might have been necessary due to a growth in the size of the population (Kaplan 1983). Moravians describe two or three adjacent houses occupied at the same time, each inhabited by an average of 19.4 people (Taylor 1974:71). In contrast, a Thule settlement might have consisted of 25–30 people altogether. Western overhunting of walrus and whales had decimated these populations, so Inuit were largely dependent on seals, though they continued to actively hunt whales. Poor hunting conditions resulting from storms or early spring thaws would have put large groups living on outer islands in a predicament; if they had not cached enough food and were unable to hunt or get off the islands due to stormy conditions, people would be in distress. In contrast, the new communal house site locations, when examined in relation to resource zones, were centrally placed. From these locations Inuit could exploit a variety of terrestrial and marine environments, and communities could reach one another and provide mutual aid (Kaplan 1983).

Researchers have debated the reasons for the adoption of communal houses and the emergence of exceptional male leaders. Schledermann (1976a, 1976b) and Richling (1993) have argued that a deteriorating climate resulting from the Little Ice Age caused people to reside together to share scarce resources. Jordan (1974, 1977, 1978), Kaplan (1985b, 1997), Taylor (1974, 1988), and Kaplan and Woollett (2000) have argued the arrangement helped Inuit maximize trading opportunities and organize labor. Kaplan and Woollett have suggested that Inuit in the eighteenth century were coping well with environmental conditions that were not particularly severe, and that the stresses they felt had to do with social and economic pressures brought about by the mounting European presence along the central and northern coast.

A Successful Eighteenth-Century Adaptation

The eighteenth-century Uivak Point-1 site in the Okak region has provided data with which Kaplan and Woollett have been able to reconstruct what an eighteenth-century communal house economy looked like, and how Inuit adapted to Labrador's complex environment

and dynamic contact situation. The site includes the remains of nine visible communal semisubterranean sod houses with extensive middens, tent rings, hunting blinds, graves, route markers, caches, and outdoor hearths. The hills above the site offer a panoramic view of the area. Hunters could survey for bowhead whales in the Atlantic, sunning ringed seals on the stable ice of inner Okak Bay, and a variety of sea mammals and birds at the sina.

House 7, an 18 m by 12 m structure (Kaplan 2009; Kaplan and Woollett 2000; Woollett 2003, 2007) was a multifamily structure with a semisubterranean entrance passage, cold trap, two raised sleeping platforms, multiple lamp stands, and a paved stone floor. The house was erected using posts and beams made from whale crania and ribs, a whale scapula, and white spruce (*Picea glauca*) krummholtz. The use of whale-bone supports was pragmatic but also probably had a spiritual significance given the close association of whales, women, and houses, seen in Thule-based traditions in north Alaska and the Canadian High Arctic.

Moravian written accounts document people living at Uivak between the 1770s and 1807 (Taylor and Taylor 1977:60, 61). An average of 19.9 people lived in a Uivak sod house between 1777 and 1784 (Taylor 1974:71). Wooden house beams, dated using dendrochronology, and analyses of the dates of the historic artifacts suggest that House 7 had two distinct occupation periods, one from 1772 to 1780, when the population was at its peak, and a second from 1792 to 1806 (D'Arrigo et al. 2003; Woollett 2003).

Traditional Inuit artifacts recovered from the house and midden reveal that the occupants of House 7 employed implements similar to those used by their Thule ancestors and could operate on land, in open water, along the ice edge, over snow-covered terrain, and on the sea ice. European-manufactured materials, probably acquired through long-distance trade and in direct exchange with Moravian missionary traders, who established a mission station on Okak Island in 1776, were used as well. Exotic goods had been effectively and selectively incorporated into many facets of Inuit life. For instance, pieces of metal were reworked into harpoon endblades and ulu blades, and both metal thimbles and traditional leather thimbles were in use. Western-made ceramic dishes, some with repair holes, were used along with soapstone, wood, and baleen vessels (see Cabak and Loring 2000 regarding the adoption of Western dishes). Firearms were employed along with the bow and arrow and toggling harpoon.

Animal bones recovered from the House 7 midden support the subsistence picture reconstructed using the artifacts, showing a general economy and use of a number of different environments. Over 70 percent of the 26,769 identified bones belonged to marine mammals. Ringed seals and harp seals were the most frequently hunted animals, followed by harbor and bearded seals (Woollett 2003, 2007). Fish, mussels, birds, caribou, and furbearing animals were also represented in the faunal collection, demonstrating use of a diversity of resources.

Bones of large whales and baleen deposits were found at the site. Moravian missionaries reported that people in the Okak region caught a whale every few years. This suggests that these large marine mammals were valuable but not dependable sources of food in the late eighteenth century. When one was caught it was shared with other communities and its baleen was harvested for trade. The procurement of a whale most likely reinforced the hunters' sense of identity, the distribution of meat strengthened kinship ties

and networks of mutual aid (Kaplan and Woollett 2000), and the baleen ensured participation in the long-distance trade.

The extent to which Inuit were tuned into the rhythms of animal seasonal movements is revealed by Woollett's (2003, 2007) analysis of seal tooth thin sections. Harp seals were intensively hunted in the fall, when they leisurely migrated through Labrador waters in large numbers. Adult ringed seals were hunted at breathing holes throughout the winter, and young ringed seals were a focus of the spring hunt, when they sunned on the fast ice.

Moravian missionaries remarked on the large number of dogs in an eighteenth-century Labrador Inuit dog team (Taylor 1974:37). Sled dogs require a great deal of meat. Analysis of House 7 dog remains revealed that dogs were not being culled when young; rather, they died at relatively advanced ages, at the end of their useful careers (Woollett 2003). This is another indication that Inuit enjoyed a degree of subsistence security at this time.

Climate records reveal that during the late 1700s, Labrador experienced a cold, but environmentally stable period that was followed by a period of severe cold in the early 1800s (D'Arrigo et al. 1996, 2003; Grumet et al. 2001; Overpeck et al. 1997; Teillet 1988; Woollett 1999). The inhabitants of Uivak had the technologies and strategies to hunt the animals present during this cold period and live comfortably.

Inuit Use of Terrestrial Resources

Wood was used to build House 7 and cover a sleeping platform in the house. In addition, a variety of implements were fashioned from wood. Plant remains (macrobotanical samples) collected from House 7 and its midden provide additional details about the house (Kaplan 2009, 2012; Woollett 2003; Zutter 2009) and Inuit use of terrestrial resources. The rear sleeping platform was insulated and padded with spruce, crowberry, willow, and birch boughs. Crowberry and birch twigs and spruce needles spread on the floor collected grease and food particles. Periodically they were swept out of the house (sweeping episodes are evident in the midden) and replaced.

High concentrations of crowberry and blueberry seeds were recovered in midden sediments (probably from human coprolites) and from under the sleeping platform, where a human coprolite was recovered (Zutter 2009). These remains suggest that people were consuming large amounts of fruit, in all likelihood harvested in late summer or early fall and stored for use throughout the winter. Few herbaceous plant remains were recovered, but House 7 occupants probably harvested a variety of plants to use as food, medicine, and dyes (Hawkes 1970 [1916]: 35–37).

Many varieties of beetles found in house and midden sediments support the macrobotanical analysis. In all likelihood, people unknowingly brought the beetles into their home when they carried in freshly cut tree trunks and boughs. The beetles included ground beetles typically found in conifers and mosses, bark beetles usually attracted to recently cut wood, and rove beetles found in willow and alder leaf litter (Bain 2000).

Archaeological evidence reveals that the inhabitants of House 7 used plants regularly to make their house a comfortable home and to augment their diet. In all likelihood,

women, children, and elders collected the plants from the surrounding area, while men felled the trees. The impact of this intensive harvesting of wood on the local ecology around Uivak and other sod house sites such as Oakes Bay-1 is the subject of ongoing research by Kaplan (2012) and Woollett (Lemus-Lauzon et al. 2012).

This picture suggests that by the late 1700s, and probably earlier, Inuit actively harvested plants and trees available in Labrador to create a comfortable home, hunted terrestrial and marine animals to feed families and dog teams, and gathered plants and berries to supplement their diet. They were part of a long-distance trade through which they selectively acquired useful exotic materials. Clearly, at the end of the 1700s, the inhabitants of Uivak enjoyed a bountiful life.

OVERVIEW

Surveys and excavations along the length of the Labrador coast are beginning to bring to light the different ways groups of Inuit adapted to Labrador, a land rich in resources, but geographically and environmentally challenging as well. A complex and dynamic Labrador Inuit culture history, one marked by ongoing flexibility and adaptation, resulted from the conjunction of culture, history, geography, and environment. Geographically, Labrador is relatively isolated from more northern regions. However, as a result of the accident of history and geography, as well as Inuit adaptability, by the eighteenth century, Labrador Inuit were integrated into a world economy while their culture evolved socially, economically, and politically. They continued to adapt to changing environmental and social circumstances. They employed many of the technologies and strategies with which their Thule ancestors came to Labrador, while selectively adopting European materials and technologies they found useful. Increasingly, they felt social and economic stresses resulting from the growing presence of Westerners along their shores and in their communities, but tried to take advantage of the evolving situation when possible.

NOTE

1. Archaeologists stopped using the term “Thule” and used the term “Inuit” once it was clear that contact with Westerners had taken place, and this chapter follows that convention.

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CHAPTER 37

DEVELOPMENT OF POLAR INUGHUIT CULTURE IN THE SMITH SOUND REGION

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THE Inughuit, or Polar Inuit, live along the coastal fringe of northwestern Greenland, an area bounded to the south by Melville Bay, to the north by the Humboldt Glacier, to the east by the inland ice and to the west by the waters of Baffin Bay, Smith Sound, and Kane Basin. In historic and prehistoric times they also made use of parts of Ellesmere Island. These are the most northerly indigenous communities in the world. Today, people are concentrated in five towns in the southern part of this area, but contemporary hunters continue to use more northerly areas on short-term seasonal hunting trips. Traditionally, Inughuit are almost exclusively maritime hunters and all known settlements are on the coast. Minimal archaeological survey has been conducted in inland regions, but oral histories, to say nothing of the forbidding landscape, support this interpretation.

As a regional manifestation of broader Inuit culture, Inughuit are distinct in a variety of ways. When Captain John Ross first visited them in 1818, they apparently thought they were the only people in the world, although others seem to have known they were there. They are perhaps best known among anthropologists for their lack of important technological components in the early nineteenth century: kayaks, leisters, bows and arrows, present in the archaeological record (Holtved 1944, 1954; Wissler 1918), had all been lost, leaving the Inughuit vulnerable to seasonal food shortages and even starvation (Gilberg 1974–1975, 1976, 1984). This severe technological loss is said by the Inughuit to have been the result of an epidemic which killed most of the older adults, leaving young people to fend for themselves (Rasmussen 1908), but the timing and exact nature of this disaster are unclear. Others have attributed at least some aspects of it to a decline in the availability of wood, and decreased utility of kayaks during the Little Ice Age (Gilberg 1974–1975 and

references therein). According to accounts recorded by Rasmussen, Inughuit in the first half of the nineteenth century also did not eat caribou or fish. All this changed in the 1860s, when a small group of Inuit from Baffin Island, led by the shaman Qitdlarssuaq, arrived to settle in the region (Mary-Rousselière 1991; Ulloriaq 1985). These men and women reintroduced kayaks and bows, among other things, although in some ways they were themselves assimilated into Inughuit society (Gilberg 1974–1975). Through the nineteenth and early twentieth centuries, contact with Euroamericans increased steadily, until 1910, when Knud Rasmussen established the Thule trading station, the first permanent colonial presence in the region. Families began settling around the trading station and mission, and the community there grew through the first half of the twentieth century. Although they were more sedentary, hunting continued to be the main economic activity for most families, and policies introduced by Rasmussen ensured that traditional hunting techniques remained viable (Gilberg 1984). In 1954, the community at Thule was forcibly relocated to Qaanaaq at the request of the US military, which had established a large Air Force base nearby. This move resulted in considerable hardship (Lynge 2002). Today, Qaanaaq is the administrative center for the region, with the only commercial airport (other communities are serviced by a helicopter), a small hospital, and a school. Wage-earning jobs are scarce, and many families still rely on hunting for some or all of their income. Strong regulation of hunting by a local council means that this is one of the only areas in the north where dog sledges are still the main mode of transport in the winter, and hunters continue to use kayaks and harpoons on a regular basis. Access to the community has always been limited by the challenges of travel in the region, but until recently government regulations posed an additional barrier, since access by air was through the Thule Air Base and official permits were required. This barrier was lifted in 2001, when an airport was constructed and fixed-wing commercial flights to west Greenland were introduced.

In recent times, then, contemporary Inughuit culture has developed in large part in isolation, but also through contact both with other Inuit and with Euroamericans. In this chapter, following in the path of Gulløv (1997), we will argue that this pattern can be extended into the past, and that prehistorically both contact and isolation were important factors. To do so we will examine the results of previous archaeological and anthropological or ethnohistorical research, as well as the results of our recent excavations at prehistoric and historic sites in Inglefield Land.

ARCHAEOLOGICAL RESEARCH

Archaeological research got off to an early start in the region, beginning with Captain George Comer's excavations in the midden at Thule/Ummanaq in 1916 (Wissler 1918). Knud Rasmussen excavated in the midden at his trading station as well and carried out some survey as part of the Second Thule expedition from Thule north along the coast of Greenland to Cape Morris Jessup (Mathiassen 1927; Rasmussen 1921). One of the goals of the expedition was to identify archaeological remains, winter houses in particular,

that would throw light on migrations or “Eskimo wanderings” (Rasmussen 1921:xviii) to north Greenland. In spite of heavy spring snow cover, Rasmussen identified many of the major Thule sites along the coast, including Ruin Island and Innuarfissuaq.

Following in Rasmussen’s footsteps some twenty years later in 1934, Erik Holtved conducted the most extensive survey and excavations to date (Holtved 1944, 1954). He excavated in Thule winter houses and middens at Ruin Island, Innuarfissuaq, and Ummanaq, including Comer’s Midden, among other places. In fact, he excavated “practically every identified house ruin within a wide area, viz. from Cape Ingersoll to Cape Kent” (Holtved 1944 II:5). Holtved’s reconstruction of Thule-period prehistory of the region was important at the time, but suffers from a lack of accurate dating. Holtved returned to the region in 1947 to extend his excavations at Comer’s Midden and to excavate the winter-house ruins at Nugdlit, but this work did not substantially alter his view of regional prehistory. Some years later Knuth (1977–1978) returned to Nugdlit, but his focus was the Paleoeskimo occupations.

For nearly twenty years there was virtually no archaeological research in the region. The pace of research picked up in the mid-1990s with the Gateway to Greenland project (Appelt 2004; Appelt et al. 1998), which focused on late Paleoeskimo occupations, followed by the authors’ ongoing survey and excavations beginning in 2004 known as the Inglefield Land Archaeology Project (ILAP). ILAP research included both foot and aerial surveys of much of the coast of Inglefield Land, as well as excavations, primarily on Thule or historic Inughuit sites. Many key areas, particularly to the south of Inglefield Land, remain virtually unstudied, although they have great potential for addressing significant issues in Arctic prehistory.

Across Smith Sound, Peter Schledermann and Karen McCullough conducted extensive research on the central coast of Ellesmere Island. Schledermann rightly argues that Smith Sound should be considered as a whole, including both Ellesmere and Greenland, and their results offer a complementary view of greater regional prehistory (McCullough 1989; Schledermann 1990; Schledermann and McCullough 2003). Their work covered the whole span of Arctic prehistory, and for that reason, provides the best general view of regional culture history. For the Thule period, there is evidence for periods of abandonment between the sixteenth and eighteenth centuries, for example, although as they make clear, abandonment of Ellesmere Island does not necessarily imply abandonment of the region as a whole (Schledermann and McCullough 2003).

FROM THULE PREHISTORY TO HISTORIC INUGHUIT

Understanding the Thule prehistory of Smith Sound is key to understanding the development of Inughuit culture and, as will become evident, this requires some understanding of the whole sweep of Thule culture. By the mid-nineteenth century, when

Euroamerican expeditions were regularly coming into contact with Inughuit, and even beginning to overwinter among them, it is clear that they had developed a socio-economic system shaped both by the specific features of their environment and by events recorded in oral history and in prehistoric archaeological remains. The following summary is based on the extensive work by Holtved (1944) in Greenland, and Schledermann and McCullough (2003; McCullough 1989) on Ellesmere Island.

As the “Gateway to Greenland,” the Smith Sound region generally, and Inglefield Land in particular, has long been seen as vital to understanding Greenland’s prehistory. Waves of migrants have crossed the ice of Smith Sound from Ellesmere Island to Greenland, populating and repopulating the island over the last 4,500 years.

The earliest Thule occupants are generally thought to have been the Ruin Islanders, who arrived in the region, probably in the thirteenth century, having migrated relatively rapidly from Alaska. This phase is named for the first site where it was identified, Ruin Island in Marshall Bay, central Inglefield Land. Holtved recognized the distinctiveness of the remains excavated here, but lacking stratigraphic control and radiocarbon dating did not identify them as the first migrants to the region. Archeologically, the Ruin Island phase is characterized as having a prevalence of Western Thule (Punuk) artifact types, in particular the distinctive “Sicco” harpoon head (Ford 1959); use of both Norse and meteoritic iron; an adaptation focused on open-water and ice-edge hunting; small houses with kitchens, alcoves heated by open fires, and minimal sleeping platforms; and the use of pottery, including decorated sherds identified by McCullough (1989) as the Barrow Curvilinear type. Neutron activation analysis of these ceramics distinguished between thin, decorated sherds and cruder, coarser wares, supporting the idea that they were made in different places with distinctly different clays, and may have been brought directly from Alaska (Stimmel 1994). Ruin Island sites are well documented on both sides of Smith Sound, and they are known from Ummanaq (Holtved 1944) and Cape Grinnell (LeMoine and Darwent 2010), in addition to the type site.

Increasingly, the Ruin Islanders are seen as true “Thule Pioneers,” representing the first Thule occupants not only of Smith Sound, but of the eastern Arctic generally (Friesen and Arnold 2008; McGhee 2000, 2009). According to McGhee (2009:82), they would have been one of perhaps two or three small groups (100–200 people) moving out of western Alaska at this time whose numbers could account for all the subsequent occupations of the Canadian Arctic and Greenland. The Ruin Islanders’ links to Alaska, and the evidently rapid pace of their migration make them stand out, but it seems likely, as Gulløv (1997) has argued, that they were not the only migrants to reach Smith Sound in the thirteenth century. Rather, based largely on harpoon head typology, he identifies two parallel traditions present in the Smith Sound region at the same time—Ruin Island and what is more widely recognized as Classic Thule (Gulløv 1997:475). On Ellesmere Island, Schledermann and McCullough (2003) identify this phase by a more diverse array of harpoon head types, including those typical of Classic Thule elsewhere in the Canadian Arctic, a decreased frequency (but not absence) of Norse objects, an increase in fast-ice hunting, based on the relative frequency of fixed-foreshaft harpoons among other things, larger houses with raised, paved sleeping platforms and lacking a separate

kitchen, and the use of soapstone lamps instead of open fires. The extent to which whaling, one hallmark of Classic Thule, was important is unclear. Certainly whale bone and baleen are common finds in houses from this period (e.g., LeMoine and Darwent 2010; Schledermann and McCullough 2003), and Hadley et al. (2010) have documented significant nitrogen enrichment associated with whale butchering in ponds adjacent to Thule sites in the Bache Peninsula region. Holtved (1944) similarly distinguished early Thule occupations from those of the Ruin Island phase, using many of the same criteria, as well as stratigraphic relationships from Comer's Midden. Schledermann and McCullough (2003) attribute these changes to a combination of diffusion and possible migration from Classic Thule populations in the central Arctic, but an examination of radiocarbon dates from Smith Sound seems to support Gulløv's contention that the two groups were contemporaneous.

Figure 37.1, Table 37.1 and Table 37.2 present 68 Thule-era dates from Smith Sound, reported by Schledermann and McCullough from their work on Ellesmere Island, ILAP, and various sites in northwest Greenland redated by Appelt. Also included are two early dates from Nugdlit and Ruin Island submitted to the Copenhagen radiocarbon lab in the early 1970s (Tauber 1973). All dates have been calibrated with Oxcal (Bronk Ramsey 2009; Reimer, et al. 2004) and are presented with ranges spanning two standard deviations. Dates on sea mammal bone have been excluded; materials dated include land mammal, plants (dryas, heather, willow), and cloth.

Dates on Ruin Island features cluster in the thirteenth century, although some are decidedly earlier. McGhee (2009) suggests that such dates may be contaminated with sea mammal fat, and that is indeed a possibility. But certainly the dates recently obtained by Appelt (2004) on caribou and muskox collagen seem unlikely to suffer from this problem, although they are earlier than McGhee's model would indicate. Interestingly, a number of dates from sites described by their excavators as Classic Thule are indistinguishable from Ruin Island dates. In particular, there are some very early dates from Eskimobyen House 1 and House 25 (Schledermann and McCullough 2003) and some rather late dates from the Sverdrup site House 6 (McCullough 1989). This suggests either that the Ruin Island phase was relatively short-lived, transforming into or being replaced by Classic Thule relatively quickly, or that two distinct groups of people moved into the region within a short time. Gulløv (1997) has clearly argued for the latter scenario, while Schledermann and McCullough (2003) support the former. Given the compressed timeframe indicated by the radiocarbon dates and the fact that they fall on a part of the calibration curve where fluctuations make precise dating unlikely, it is currently not possible to distinguish between these two scenarios.

Through time, as elsewhere in the region, Classic Thule, or a blend of Ruin Island and Classic Thule, transitions into modified or Late Thule as populations adapt to changing local conditions. Holtved (1944 II:25) suggested these early changes were the result of contact with the more heavily Norse-influenced Inugsuk culture of west Greenland, but reports that "no revolutionary impulses" from the south can be detected after the fourteenth century (based on dating of Norse objects), implying either *in situ* development or influences from Canada. On Ellesmere Island, Schledermann and McCullough



Graph compiled by Genevieve LeMoine

Table 37.1 Radiocarbon Dates from Thule-Inughuit Archaeological Sites in the Smith Sound Region

Lab Number	Site Reference	RCYBP	2 σ cal a.d. ¹	Material Dated
GSC3553	Sverdrup H6 ⁴	1110 $\pm$ 60	777–1023	willow
K1100	Nugdlit H4 ⁴	1040 $\pm$ 100*	772–1215	willow
K1099	Nugdlit H29 ⁴	1020 $\pm$ 100*	779–1217	pine
GSC3098	Skraeling H3 ⁴	970 $\pm$ 100	781–1225	willow
GSC2796	Eskimobyen H1 ⁵	970 $\pm$ 120	782–1273	willow
K1505	Ruin Is. H4 ⁴	930 $\pm$ 100*	898–1273	spruce
GSC3379	Eskimobyen H25 ⁴	910 $\pm$ 50	1025–1217	willow
KIA16942	Cape Kent ²	892 $\pm$ 36	1040–1217	muskox horn
KIA17726	Qeqertaaraq ²	891 $\pm$ 29	1041–1216	caribou antler
KIA17726	Nuulliit ²	884 $\pm$ 25	1045–1218	muskox horn
K1506	Ruin Is. H6 ⁴	880 $\pm$ 100*	974–1290	spruce
GSC3197	Skraeling H6 ⁴	810 $\pm$ 50	1040–1264	willow
GSC2938	Skraeling H10 ⁴	760 $\pm$ 60	1042–1276	willow
GSC3003	Skraeling H22 ⁴	790 $\pm$ 50	1046–1279	heather
GSC2922	Skraeling H9 ⁴	780 $\pm$ 70	1040–1291	willow
GSC3033	Skraeling H14 ⁴	800 $\pm$ 70*	1040–1297	willow
GSC3396	Eskimobyen H25 ⁴	730 $\pm$ 70	1050–1392	heather
GSC3007	Sverdrup H7 ⁴	770 $\pm$ 50	1161–1297	willow
GE06069	Skraeling H6 ⁴	675 $\pm$ 110	1052–1446	oak
KIA16941	Nuulliit ²	724 $\pm$ 20	1261–1292	muskox horn
K1489	Ruin Is. H6 ⁴	680 $\pm$ 100*	1155–1441	wool
GSC2924	Skraeling H15 ⁴	640 $\pm$ 70	1191–1410	willow
AA88111	Glacier Bay F30-2	726 $\pm$ 44	1216–1387	caribou/muskox long bone
AA85150	Cape Grinnell F20-2 ³	714 $\pm$ 59	1210–1399	caribou rib
GSC3038	Skraeling H15 ⁴	750 $\pm$ 50	1222–1394	wool
AA88107	Qaqaitsut F3-1	694 $\pm$ 43	1229–1394	caribou/muskox long bone
AA90329	Qaqaitsut F65-1	678 $\pm$ 52	1255–1405	caribou scapula
AA85147	Cape Grinnell F18-2 ³	672 $\pm$ 59	1252–1410	muskox femur
BETA233264	Etah H1 (knk2643x705) ³	660 $\pm$ 40	1274–1397	arctic hare pelvis

(continued)

Table 37.1 Continued

Lab Number	Site Reference	RCYBP	2 σ cal a.d. ¹	Material Dated
AA85149	Cape Grinnell F20-1 ³	659 $\pm$ 58	1263–1409	caribou rib
GSC3156	Skraeling H21 ⁴	630 $\pm$ 60	1260–1412	heather
AA8364A	Cape Grinnell F107-1 ³	685 $\pm$ 53	1269–1405	caribou tooth
AA85148	Cape Grinnell F18-3 ³	655 $\pm$ 58	1265–1410	caribou rib
AA88108	Qaqaitsut West F3-2	653 $\pm$ 43	1276–1400	caribou metatarsal
AA88106	Qaqaitsut West F2-2	649 $\pm$ 43	1277–1400	caribou femur
K4469	Cape Kent ²	640 $\pm$ 50	1278–1405	caribou antler
AAR3233	Qeqertaaraq ²	640 $\pm$ 50	1278–1405	caribou bone
GSC3561	Sverdrup H6 ⁴	590 $\pm$ 50	1284–1410	heather
GSC3013	Skraeling H9 ⁴	620 $\pm$ 50	1284–1410	willow
AA83638	Cape Grinnell F16-2 ³	616 $\pm$ 42	1289–1409	caribou thoracic vertebra
GSC2953	Eskimobyen H1 ⁵	610 $\pm$ 50	1285–1414	heather
AA85146	Cape Grinnell F18-1 ³	606 $\pm$ 58	1283–1420	caribou lumbar vertebra
AA83637	Cape Grinnell F16-1 ³	603 $\pm$ 42	1292–1412	caribou rib
AA85151	Cape Grinnell F20-3 ³	605 $\pm$ 59	1283–1422	caribou rib
GSC3174	Skraeling H8 ⁴	550 $\pm$ 60	1284–1424	willow
GSC3772	Sverdrup H8 ⁵	590 $\pm$ 70	1282–1436	heather
GSC3059	Skraeling H15 ⁴	550 $\pm$ 50	1295–1426	heather
AA88105	Qaqaitsut West F2-1	547 $\pm$ 42	1304–1440	caribou premolar
GSC3477	Haa ls. H19 ⁵	530 $\pm$ 60	1295–1454	heather
AA90330	Qaqaitsut F65-2	519 $\pm$ 52	1300–1455	caribou rib
GSC3408	Haa H24 ⁵	500 $\pm$ 50	1306–1476	heather
GE06073	Eskimobyen H3 ⁵	560 $\pm$ 120	1220–1634	oak box
AECV-1313c	Sverdrup H20 ⁵	480 $\pm$ 100	1295–1635	heather
AA90331	Qaqaitsut F71-1	452 $\pm$ 53	1328–1631	caribou premolar
GSC3018	Eskimobyen H3 ⁵	440 $\pm$ 70	1328–1640	dryas
GSC2950	Eskimobyen H3 ⁵	430 $\pm$ 70	1333–1643	dryas
BETA233262	Etah H1 (knk2643x703) ³	450 $\pm$ 40	1406–1618	arctic hare tibia
BETA233265	Etah H1(knk2643x706) ³	440 $\pm$ 40	1409–1620	caribou calcaneus
AAR7270	Innuarfissuaq ²	431 $\pm$ 38	1413–1620	caribou antler
GSC3267	Eskimobyen H3 ⁵	400 $\pm$ 50	1428–1635	willow
AA90332	Qaqaitsut F71-2	373 $\pm$ 52	1443–1638	caribou thoracic vertebra

Table 37.1 Continued

Lab Number	Site Reference	RCYBP	2 σ cal a.d. ¹	Material Dated
BETA233263	Etah H1 (knk2643x704) ³	360 $\pm$ 40	1450–1635	arctic hare radius
BETA233261	Etah H1 (knk2643x702) ³	330 $\pm$ 40	1465–1645	heather

* uncorrected

¹ calibration follows Reimer et al. 2004; Bronk Ramsey 2009

² Appelt 2004, cited in McGhee 2009

³ LeMoine and Darwent 2010

⁴ McCullough 1989

⁵ Schledermann and McCullough 2003

Table 37.2 Radiocarbon Dates from Thule House Deposits in Glacier Bay and Qaqaitsut (Paris Fjord), Inglefield Land, Greenland, Excavated in 2009

Arizona AMS#	Site	Feature	Provenience	Material Dated	$\delta^{13}\text{C}$ Value	^{14}C age b.p.
AA88105	Qaqaitsut West	F-2	1N, 5E; NE Quad; Level 2 (tunnel)	caribou premolar (mandibular p2/p3, no wear)	–18.8	547 $\pm$ 42
AA88106	Qaqaitsut West	F-2	2N, 3E; SW Quad; Level 2 (house interior/ kitchen area)	caribou femur (proximal/posterior shaft fragment, spiral fracture, burned <25%)	–17.6	649 $\pm$ 43
AA88107	Qaqaitsut West	F-3	2S, 4E; SE quad; level 2 (house interior/ living floor)	caribou/muskox long bone (shaft fragment, spiral fracture, burned >50%)	–18.1	694 $\pm$ 43
AA88108	Qaqaitsut West	F-3	3S, 6E; NW quad; level 3 (tunnel threshold)	caribou metatarsal (posterior midshaft fragment, spiral fracture, impact scars)	–18.9	653 $\pm$ 43
AA88111	Glacier Bay	F-30	3N, 5E; SW quad; level 2a (house interior/ living floor)	caribou/muskox long bone (midshaft fragment, spiral fracture)	–19.5	726 $\pm$ 44
AA90329	Qaqaitsut	F-65	1N, 2E; NW quad; level 2 (house interior/ kitchen area)	caribou scapula (glenoid + $\frac{3}{4}$ blade)	–18.5	678 $\pm$ 52
AA90330	Qaqaitsut	F-65	1N, 5E; level 4 (tunnel)	caribou rib (midshaft fragment)	–20.6	519 $\pm$ 52
AA90331	Qaqaitsut	F-71	2N, 3E; NW quad; level 2 (house interior/ living floor)	caribou premolar (slight wear)	–19.4	452 $\pm$ 53
AA90332	Qaqaitsut	F-71	3N, 4E; SW quad; level 3 (tunnel)	caribou thoracic vertebra (spine fragment)	–20.7	373 $\pm$ 52

(2003) link large, multilobed semisubterranean houses to similar trends observed in Greenland and described by Holtved (1944) as the Late Transitional period, and in the central Canadian Arctic as exemplified by sites such as Qilalukan on northern Baffin Island (Mathiassen 1927), dating to the sixteenth and seventeenth centuries.

These changes clearly imply ongoing contact, particularly with the eastern Canadian Arctic. Schledermann and McCullough (2003:124) suggest that new groups of people moving in from the central and eastern Arctic may be responsible, although they acknowledge that diffusion might also have played a role, particularly in light of the widespread similarity of Classic Thule culture sites. Considering the widespread use of Cape York meteoritic iron by Thule people across the Canadian Arctic (McCartney 1991; McCartney and Mack 1973), and the possible role of such iron as a lure for early migrants (McGhee 1984), it seems clear that this was a two-way process, with ongoing exchange of people, material, and ideas through the Classic Thule period. Trade, of iron and other goods, across vast areas is well documented into the historic period in both Canada (McCartney 1991; Stefánsson 1914) and Greenland (Gulløv 1997).

Evidence from both linguistics (Fortescue 1997) and ethnomusicology (Hauser et al. 2010) supports the idea of a movement of people into the region sometime around the seventeenth century. The timing is open to question, since it is largely based on scant archaeological data—in both cases the authors cite Meldgaard's 1981 paper from the *Vort Sprog-vor Kultur* symposium in Nuuk as their only archaeological source. Nevertheless, historic and contemporary Inughuit language and music both exhibit close relationships with the Copper Inuit, and together with the similarities in material culture and architecture, it is evident that at some point in the last few centuries there were strong connections, including perhaps a migration, with that region.

Data for subsequent periods are sparse. The central coast of Ellesmere Island appears to have been largely abandoned, at least as an overwintering location, sometime in the seventeenth century (Schledermann and McCullough 2003). In the course of extensive surveys, Schledermann and McCullough identified only one historic occupation, the Brice site, which they attribute to the migration from Baffin Island in the 1860s (Mary-Rousellière 1991). They found no earlier historic artifacts such as would be expected from trade with explorers or whalers, and nineteenth-century explorers such as Nares and Greeley did not encounter any people living on Ellesmere.

At Comer's Midden, Holtved (1944 II:40, 179) similarly detected a break in the sequence, remarking that the seventeenth and eighteenth centuries were "but weakly represented, if at all." He based this on the absence of historic materials, which he expected to find if there had been ongoing contact with the south and on the presence or absence of artifact types, including kayak parts, bows, arrows, and fishing gear. He does not go so far as to suggest that the whole region had been abandoned, writing: "The main part of Comer's Midden bears the stamp of the culture of the Inugsuk period, and after that there must have been a stagnation in developments; people now lived elsewhere, until in a later period they again began to build houses above the old midden" (Holtved 1944 II:81). Despite this, some have since suggested the whole region was abandoned (Meldgaard 1986, cited in Fortescue 1997; Petersen 1986). Historically, Inughuit

are known to have been well established by the early nineteenth century and there are hints, in the form of stories of people moving in both directions (Hansen 1967–1970), that people in the Upernavik district knew of them in the late eighteenth century, leaving a gap of between one and two hundred years where evidence is lacking.

People who are recognizably Inughuit were first encountered in 1818, when Captain John Ross arrived in the region (Ross 1819). Ross had with him a Greenlandic man, Sacheuse, who acted as interpreter. Through Sacheuse, Ross learned a little of Inughuit culture, including the fact that they did not fish, had no kayaks, and used metal knives. An illustration based on a drawing by Sacheuse shows men dressed in clothing in the same style as their mid-nineteenth-century descendants (LeMoine and Darwent 2013), and a sledge collected by Ross and now in the British Museum is of the same type as those made historically in the region. This sled in and of itself is intriguing because it was constructed with scarfed and bound-together pieces of whale bone, caribou antler, and walrus ivory, but virtually no wood. The men Ross and Sacheuse spoke to thought the Inughuit were the only people in the world, and it would seem that they had had no contact with people south of Melville Bay for many generations. The limited picture of Inughuit culture that can be gleaned from Ross's report tallies well with subsequent more detailed reports from the mid-nineteenth century (Bessels 1884; Hayes 1867; Kane 1856). It would appear then, that by 1818, the people living around Cape York were recognizably "Inughuit," although we have only sketchy information about them.

More detailed accounts of Inughuit culture appear beginning in the 1850s. Elisha Kent Kane (1956) and Isaac Israel Hayes (1867) are useful for their descriptions of life before the arrival of Qitdlarssuaq and his companions from Baffin Island sometime in the 1860s. They describe a people in dire straits, with a declining population. During this period, Inughuit regularly lived along the coast as far north as Etah, and even Anoritok, traveling further north to hunt, but not to overwinter, which appears to be a relatively recent settlement pattern but one that we also see in the archaeological record post ca. A.D. 1500 (LeMoine and Darwent 2010). Lacking boats, they relied primarily on hunting seals and walrus from the ice when possible, and on birds during the summer. Hence places like Etah, with access to both good hunting and abundant birds, were popular (see also Darwent and Johansen 2010). To both men it was obvious that the Inughuit had lived further north in the not too distant past, and Hayes was even asked by Kalutunah to look for people as he explored to the north—he knew that there had been people there, and that there was good muskox hunting. Hayes (1867:347) presumed that Inughuit had simply lost contact with them, as they had with the people to the south, and he reports that Kalutunah's explanation for losing contact in both directions was because of ice expansion. Zooarchaeological data from early Thule deposits at Cape Grinnell and Qaqaitut in Paris Fjord lend support for more open-water hunting of bowhead and narwhal, with considerably more attention paid to active acquisition of walrus during the thirteenth to sixteenth centuries that drops off during the seventeenth and eighteenth centuries, only to reemerge in the late nineteenth century.

Shortly after Hayes's stay, Inughuit life was changed in many ways by the arrival of a group of migrants from Baffin Island, led by the shaman Qitdlarssuaq (Mary-Rousselière

1991; Ulloriaq 1985). This small group of men, women, and children had a significant impact on Inughuit society. They are best known for reintroducing key technological systems, including kayaks, bows and arrows, and fishing gear. These items, particularly kayaks, relieved the Inughuit of the need to ensure that they were established in a productive location, such as near a bird cliff, for the entire summer and early fall season (Gilberg 1974–1975). It became possible for them to hunt seals, narwhal, and walrus in open water as well as from the ice. This coincided with the end of the Little Ice Age, when the open-water season was getting longer. Together, these technological improvements, along with the influx of new people—16 in total, estimated to be nearly 10 percent of the existing population (Gilberg 1976)—may have helped save the Inughuit from eventual extinction.

Following the arrival of the Baffin Island migrants, the Inughuit annual round changed to accommodate the possibility of open-water hunting. A return to active walrus hunting is supported by a dramatic increase in the relative frequency of walrus bones in the late nineteenth- to early twentieth-century deposits at Etah. Trade materials continued to filter into the region as overwintering expeditions became more common. In the 1890s, Robert E. Peary began his long career in the region, changing Inughuit material culture dramatically, ultimately giving every hunter access to high-quality firearms and other manufactured goods. In 1909, Knud Rasmussen established the Thule trading station, in part to compensate for the anticipated reduction in access to trade goods when Peary's expeditions ended. As the trading station expanded to include a mission and eventually medical facilities and a school, families began to spend more time there, and a permanent community developed at Umanaq. Despite the increasingly sedentary lifestyle of some families, hunting remained the focus of their economy, and the stereotype of the Inughuit as hunters par excellence became entrenched in popular culture. Books like *The Last Kings of Thule* (Maurie 1956) reinforced this image among the general public in the south, but their reputation as great hunters is strong among other indigenous Arctic hunters as well. Keld Hansen (Hansen 1969–1970) describes how the hunters of Upernivik district borrowed ideas ranging from clothing to sledge and harpoon design from Thule hunters. Their reputation as exceptional hunters continues today, although the focus now is largely in the context of climate change and expectations of their imminent demise as a hunting society (Erlach 2006).

FROM THULE TO INUGHUIT: THE EVIDENCE GAP

The archaeological record up through the sixteenth century provides a clear picture of what we have come to expect of a late-prehistoric adaptation in the High Arctic. On both sides of Smith Sound there is evidence for a typical Thule/Inuit adaptation, including a reliance on sea mammals hunted both from the ice and from open water with kayaks, more limited use of caribou and muskox hunted with bows and arrows, and even fishing equipment. Fish-bone recovery is extremely rare, but there is direct evidence for prehistoric fishing at Cape

Grinnell (Darwent and Foin 2010) and Qaqaitsut. By 1818, however, the situation was different. Ellesmere Island had been abandoned and the people living in northwestern Greenland had developed a specialized, and significantly restricted, adaptation. By all accounts they lacked boats and the transportation and hunting access these would have provided; bows and arrows, which limited the ability to hunt muskox (although they were occasionally taken [Hayes 1867; Kane 1856]), and whose loss appears to coincide with a taboo against eating caribou (Rasmussen 1908:32); and fishing equipment. What happened and when? Clearly something changed in the seventeenth or eighteenth century.

Effectively filling in this gap with existing evidence is tricky. Beginning in the eighteenth century, the radiocarbon calibration curve exhibits dramatic variation, essentially rendering post-1700 dates useless for precise dating (Taylor 1987). As the extremely long bars for later dates in Figure 37.1 indicate, dates in this period typically intercept the curve at multiple points, resulting in imprecise calibrations. At best we can say the region was occupied at some point between about 1650 and 1800. In many parts of the world, historic artifacts and/or stratified deposits can be used to fill this gap, allowing the construction of detailed chronological sequences. In Smith Sound, however, historic artifacts are uncommon until the mid-nineteenth century and stratified deposits of any kind are rare throughout the High Arctic. Although Comer's Midden stands out in this regard, the apparent gap identified by Holtved is a problem. To resolve this issue, then, we must rely on other lines of evidence.

One of the initial goals of the ILAP, co-directed by the authors, was to document late prehistoric and early historic occupations in Inglefield Land—the northernmost area occupied by the Inughuit and presumed to be the first landing place for migrants from Canada through the last 4,500 years. Such sites are, as it turns out, relatively uncommon. Known historic sites include Anoritok, which we were prevented from visiting by inevitable weather delays, Etah, and Innuarfissuaq (Darwent et al. 2007). Further north, Qaqaitsut on Paris Fjord and an unnamed but intriguing site discovered in 2005 on a small island only 15 km from the Humboldt Glacier (JL9A4) both have historic occupations judging by surface finds. In general, however, central and eastern Inglefield Land seems to have been used only sporadically and/or seasonally during the later Thule to early contact period. Oral histories recount how Innuarfissuaq, for example, had been abandoned and occasionally reoccupied in the early twentieth century, but with limited success (Rasmussen 1921).

Of the known historic sites, Etah seemed to hold the greatest potential, and in 2006 we excavated two historic features and conducted additional foot survey (Darwent and Johansen 2010; LeMoine and Darwent 2010). The survey confirmed our suspicion that Foulke Fjord was something of a “hot spot,” with good access to both marine and terrestrial resources drawing settlement over many centuries, at least as far back as the Late Dorset, and probably related to the massive colony of dovekies (*Alle alle*) that nest there. Our excavations focused on mid- to late nineteenth-century historic house and midden deposits, but revealed buried deposits which hold promise for understanding crucial earlier times.

The earliest Thule occupation at Etah comes primarily from deposits found below the midden in front of House 1 (Figure 37.2), in which we identified a buried semi-subterranean house with a paved sleeping platform that had been dug into an earlier Palaeoeskimo occupation. Following an undated episode of natural slumping from the



- | | | | |
|---|------------------------------------|---|---|
| A | Natural fan development | D | Sod fill |
| B | First Thule house construction | E | Possible natural deposition events |
| C | Possible natural deposition events | F | Entrance tunnel excavation and fill associated with most recent house |

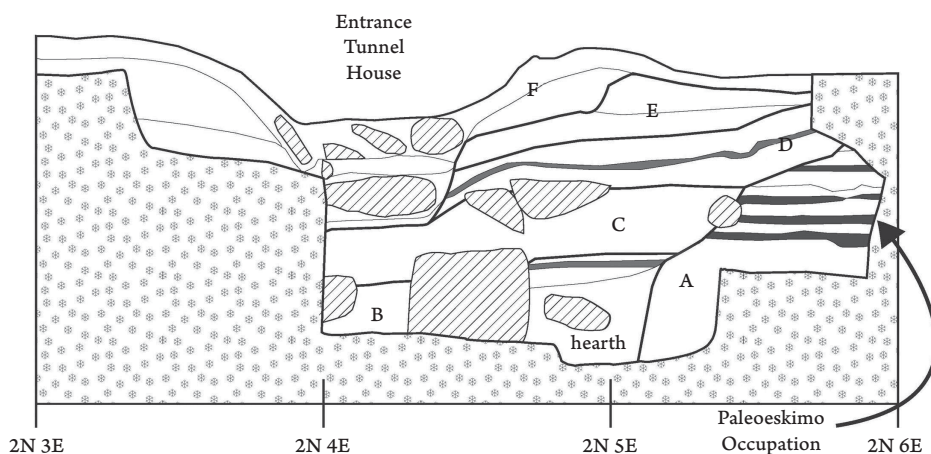


FIGURE 37.2 Photograph and profile view of the north wall of excavations units 2N, 3–6E at Etah House 1. The unexcavated entrance tunnel of the recent house can be seen in the upper center of the photograph. The profile shows details of the depositional sequence at the site, including a Paleoeskimo occupation disturbed by initial house construction by the early Thule inhabitants.

Photograph and illustration by John Darwent, Inglefield Land Archaeology Project

steep slope above, this early house was itself partially destroyed by excavations for the entrance tunnel of House 1. The builders presumably took advantage of the earlier house depression to simplify construction of the tunnel. Only a small portion of this buried structure has been excavated, and so the assemblage is small. It was encountered in the lower levels of five units in the midden, and in disturbed fill below the floor level of the front of House 1. These earlier levels are characterized by higher quantities of baleen (virtually absent from the historic levels), chert flakes, which are probably intrusive from

the Paleoeskimo levels, and a near absence of historic artifacts—a single nail shaft in the lower levels associated with the buried house was the only historic object recovered. No temporally sensitive artifacts were recovered from the levels associated with this buried structure. However, a Late Dorset Type G harpoon head was recovered from the lowest levels below the floor of House 1, which we assume is associated with the Paleoeskimo occupation of Etah. A number of dates have been run on terrestrial mammal (*Lepus arcticus*, hare) bone from these early levels (Table 37.1). Most of them fall into the fourteenth to fifteenth centuries, but one date, on a caribou bone from below the floor of House 1 bridges the gap, falling somewhere after the late fifteenth century. The presence of baleen suggests that these buried deposits are contemporaneous with Classic Thule occupations in Ellesmere Island, when bowhead whaling was still practiced. From the upper levels of the midden in front of House 1 we recovered a single harpoon head, a complete Thule Type 5 with elaborate decoration and an iron endblade, of the sort identified ethnographically as used for hunting narwhal (Figure 37.3).

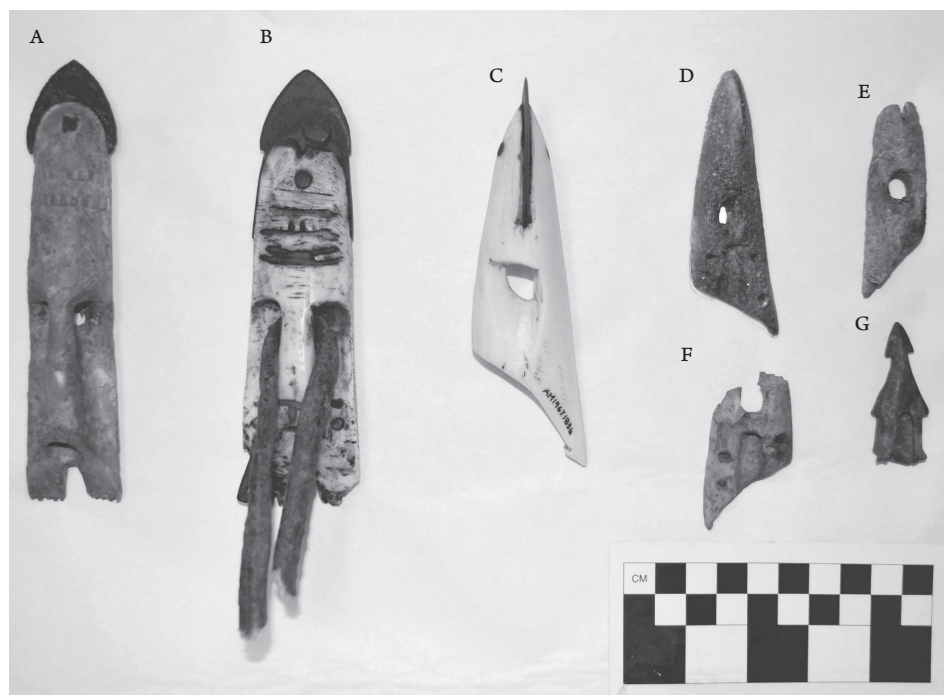


FIGURE 37.3 Archaeological and ethnographic harpoon heads from northwestern Greenland. Two Thule Type 5 harpoons, ethnographically documented for use on narwhals: (a) KNK2643x1715; (b) AM1000.1.4. Two Thule Type 4 harpoons: (c) AM1967.183b; (e) KNK2644x786. One Thule Type 3 harpoon: (d) KNK2644x463. One open-socket base with lashing holes: (f) KNK2644x673. One anomalous harpoon: (g) KNK2644x137. Ethnographic examples are from the collections of the Peary-MacMillan Arctic Museum, Bowdoin College, Brunswick, Maine, and were collected by Donald B. MacMillan in northwestern Greenland sometime between 1908 and 1954.

Photograph by Genevieve LeMoine

House 2 at Etah also includes multiple occupations, with at least three layers of flagstone floor. The upper levels are clearly mid- to late nineteenth century, but there are indications of earlier occupations as well. One date on caribou bone from the lowest floor levels falls into the post-1700 time period, but a hare bone from the same level was dated to the sixteenth century (Table 37.1, Figure 37.1). These dated deposits are associated with low numbers of historic artifacts, including lamp glass and ceramics, but no baleen. Ivory carvings from the house support the idea that its occupation spans the prehistoric-historic gap (LeMoine 2009), and fabric clothing, including a crudely sewn pair of child's wool pants, suggests a very early historic occupation (LeMoine and Darwent 2013). Three complete harpoon heads recovered from the house include one Thule Type 4 and one Thule Type 3, and one anomalous type, with an open socket and a very small self-bladed barbed tip (Figure 37.3). The fourth is a basal fragment with an open socket and line holes, possibly also a Type 3. The Thule Type 3 and 4 forms in particular are like those found in the upper levels of Comer's Midden (Holtved 1944:42, Plate 4) and identified by Gulløv (1997:464) as a late western type, dating to the sixteenth and seventeenth centuries. Similar types are found across the North American Arctic, from Classic Thule times (e.g., Naujan site [Mathiassen 1927:Plate 2]), and are also known ethnographically from the Smith Sound region. Similarly the Thule Type 5 is widely distributed and used continuously into historic times (see Figure 37.3).

House 2 at Etah, then, currently provides the best, if scanty, archaeological evidence for occupation of northwest Greenland in the seventeenth and eighteenth centuries and the continuity of Inughuit people living in the Smith Sound region, although population levels appear to have been severely reduced. The harpoon heads, found in a historic context but with both prehistoric and ethnographic analogs, along with the carvings discussed elsewhere (LeMoine 2009), in particular suggest continuity through this period. Because excavation at this site revealed stratified deposits, nearly unheard of in the High Arctic, a project has been initiated to more fully document the sequence at Etah, which should provide tighter chronological control for this crucial period.

The current archaeological picture regarding the late prehistoric period in northwestern Greenland is based on excavations conducted in the northern portion of the Thule District. There is a large gap in our knowledge of the archaeological resources to the south, in the area around Cape York and Savissivik in particular. Here we might expect to find a long sequence of occupation, including the Dorset people who first exploited the iron meteorite for which the region is famous, as well as Thule who perhaps learned of the meteorite's location from Dorset traders and certainly made good use of it in subsequent centuries. It stands to reason that families living in this area were also the last to be in contact with people south of Melville Bay, and we know that Inughuit were well established there in 1818, when John Ross first encountered them. In the early nineteenth century, whalers frequently stopped there to trade but rarely ventured further north. Lacking archaeological data from this region, then, we must look elsewhere for evidence to fill this gap.

Oral histories recorded in the early twentieth century (e.g., Rasmussen 1908:32) provide the best clues for what happened. According to them at some point in the past an epidemic killed most of the adults in the community, resulting in a loss of many

skills—those who were left had to fend for themselves as best they could. The role of epidemic disease in the Arctic has been explored in some detail by McGhee (1994). He links epidemics introduced by occasional contact with Europeans to the abandonment of large Thule winter house sites across the Canadian Arctic and ultimately to the transition from Thule whaling society to historic Inuit society, characterized by, among other things, lower overall population levels, higher mobility, and increased regional diversity. According to this model, introduced diseases would spread rapidly among local populations, with crowded conditions in winter houses exacerbating the impact (see Kane's [1856:113–114] description of a hot, crowded winter house at Etah with well over a dozen people huddled in a room no more than 3 m in diameter).

Large-scale regional epidemics would not have occurred due to relatively long distances between winter settlements—rather McGhee envisions a series of local epidemics moving through regions along trade routes. In the wake of such devastating diseases, local populations would have suffered significant “cultural loss” (McGhee 1994:574). While McGhee's model has been criticized on a number of grounds, in many respects it fits the Inughuit situation well (McGhee 1994:568). Until the beginning of the seventeenth century, residents of Smith Sound do seem to have been involved in the broader social networks that characterized the Canadian Arctic at that time. Indeed, Schledermann and McCullough (2003) and Petersen (1986) suggest that there is evidence for direct links between the central Arctic and Smith Sound around this time. The continued presence of meteoritic iron in Thule sites west of Smith Sound are telling evidence of such contact, whether it be direct or indirect (McCartney 1991). Furthermore, despite Holtved's (1944) contention that contact between Smith Sound and the more southern parts of Greenland ceased in the fifteenth century and did not resume until the early twentieth century, Hansen (1969–1970) reports at least one possible instance of later contact from the south, when a family escaping epidemics around Upernavik fled north in the late eighteenth century, as well as a story recorded by Rasmussen of a man and wife traveling south, and teaching people south of Melville Bay how to hunt on young ice. Kane (1856 II:120) reports a smallpox epidemic which struck “the upper coast” around 1820, after which the survivors fled to Upernavik. He attributes some of the abandoned houses he observed north of Etah to this exodus, although it may be that it primarily affected communities in Melville Bay. Such stories suggest that sporadic contact, at least, continued in spite of Ross's (1819) contention that the Inughuit thought they were the only people in the world. According to McGhee's model, even brief contact would be a possible vector for introduced European disease.

The impact of epidemics is highly variable of course, but there are a variety of documented cases in the Arctic. For Greenland, Gulløv (1997:360–361) has described how a smallpox epidemic killed nearly 90 percent of the inhabitants in the Nuuk Fjord region in 1734. Within five years the area had been repopulated by people migrating from south Greenland, resulting in an almost unbroken sequence of occupation, albeit by different groups. By the late eighteenth century, epidemics had hit the Upernavik district, and settlements north of Upernavik Fjord were abandoned (Hansen 2008). In Labrador, the 1919 influenza epidemic killed virtually all of the inhabitants of Okak on the northern

coast. In this case, the few remaining survivors (children) were rescued and the community was abandoned and remains empty to this day. In Alaska, widespread epidemics in the nineteenth century contributed to extensive social disruption and population movement (Burch 2006). In each of these historically documented cases, the larger community essentially filled in the gap, socially, by bringing survivors into less-affected communities, or spatially, by moving in to reoccupy devastated areas. For the Inughuit, this does not seem to have been the case. If an epidemic did rage through the community, isolation exacerbated the situation.

Extreme isolation has been one of the hallmarks of Inughuit culture since they first came to the attention of the Western world in 1818. In those days the dangerous ice of Melville Bay seemed explanation enough for this situation. Inughuit accounts would seem to support this idea. As mentioned above, Hayes recorded his companion Kalutunah's view of the matter:

he recited to me a well-established tradition of the tribe, that the Esquimaux once extended both to the north and the south; and that, finally, the tribe now inhabiting the coast from Cape York to Smith Sound were cut off by the accumulation of ice as well above as below them; and he believed that Esquimaux were living at this present time in both directions. That there was once no break in the communication between the natives of the region about Upernavik, along the shores of Melville Bay, there can be no doubt and Kalutunah appeared to think that the same would hold good in the opposite direction. (Hayes 1867:347)

Cooling during the Little Ice Age most likely accounts for the increased ice Kalutunah described. Overpeck et al. (1997) have demonstrated that climate was variable but cooler across the Arctic during this period. Recent high resolution paleoclimatological studies in the Smith Sound region provide more specific evidence for such cooling and increased sea ice, although neither the precise timing nor the extent of cooling is clear. Besonen et al. (2004) studied varve thickness in two cores from Lower Murray Lake on northern Ellesmere. Their work indicates that the twelfth to thirteenth centuries were warmest, followed by cooling beginning in the late fourteenth century, reaching maximum cold in the early eighteenth to mid-nineteenth centuries. A variety of researchers have studied multiple proxies from cores from the extreme northern end of Baffin Bay, Nares Strait, and the North Water polynya. All showed evidence of cooling and more extensive ice cover between 400 and 100 years ago (1550–1850 cal A.D.) (Knudsen et al. 2008; Mudie et al. 2005).

It is certainly possible that increased sea ice, and perhaps associated glacial advances (Miller, et al. 2005) within the previous 200 years, would be entrenched in Inughuit oral histories. But is this really sufficient reason for their isolation? As Hansen (1969–1970) points out, the trip across Melville Bay is not that far, nor necessarily that arduous. Given the opportunities for acquiring important raw materials such as wood, as reported by Hansen, why would people stop making the trip? If we consider the combined effects of an epidemic and increased ice, however, we may come closer to the truth. In this

scenario, a population significantly reduced by disease might lack the resources necessary for a long-distance journey, no matter how desirable the outcome might be. One informant (Navarana K'avigak Sørensen, Qaanaaq 2006) has suggested to us that the people who survived the epidemic were so hard-up that they simply made do with what they had, eking out locally available resources. She described this in response to a question about the unique clothing styles of the Inughuit, remarking that they sewed clothing that made the most economical use of the materials at hand—fox, seal, and polar bear (Figure 37.4). Items such as the sledge collected by Ross in 1818, made almost entirely of bone, antler, and ivory, confirm the resourceful ways in which Inughuit learned to deal with their lack of wood, but it is difficult to see how such a sledge could have made the journey across Melville Bay, and may tangentially support Schledermann and McCullough's (2003) evidence for abandonment of Ellesmere Island after the seventeenth century.

Early nineteenth-century Inughuit adaptation was shaped by events which include climate change and epidemic disease. It seems unlikely that one of these factors could on its own have resulted in the isolation and cultural losses they suffered. The cooling



FIGURE 37.4 Unidentified Inughuit family in summer clothing standing outside their tent in the 1890s. The man and boy wear polar bear pants with sealskin anoraks and kamiks, while the woman and girl wear short fox fur pants with sealskin anoraks and tall kamiks. Photograph by Emil Diebitsch.

Courtesy of the Peary-MacMillan Arctic Museum, Bowdoin College, Brunswick, Maine

climate, beginning as early as the fourteenth century, but reaching its peak in the eighteenth, might have reduced the availability of driftwood, but this alone is not sufficient to explain technological losses—as they, and Inuit elsewhere, demonstrated, sledges can be made without wood, as can bows. In any case, increased sea-ice cover reduces the utility of kayaks and umiaks as the open-water season diminishes. Some, following Vibe (1950), have suggested that Little Ice Age conditions caused ringed seals to leave the area, and although there is good evidence for abandonment of overwintering in central and northern Inglefield Land, the North Water polynya in the southern part of the region did not disappear (Levac et al. 2001), and so there would always have been access to sea mammals in Foulke Fjord and adjacent regions.

An epidemic comes closer to an explanation, but there is good evidence elsewhere for population renewal by migration, something that did not occur until much later in this case. That this did not happen may be attributed to a combination of factors, but chief among them may be a “pull” to the south due to the increased presence of Europeans and access to important raw materials that they could provide. Graburn (1969) and others have described the European presence as a new resource exploited by Inuit. By the eighteenth century, rich resources of the North Water, and even the lure of meteoritic iron, paled in comparison. The Inughuit themselves eventually succumbed to this lure as well—positioning themselves in the south, at Cape York, to take advantage of trade with whalers in the nineteenth century (Gilberg 1974–1975).

The present archaeological invisibility of this episode in Inughuit prehistory is hardly surprising given the short duration (ca. 200 years in a time period when precise radio-carbon dating is all but impossible), small numbers of sites, many of them probably reoccupations of early houses, and lack of research in the key areas where the much-reduced population must have taken refuge. Continued research at Etah, and future research at sites to the south, may eventually fill this gap.

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CHAPTER 38

INUIT-EUROPEAN INTERACTIONS IN GREENLAND

HANS CHRISTIAN GULLØV

IN every century since the Middle Ages there have been Europeans in Greenland. Medieval Norse farmers settled in the southwestern part of the country and met with Native Greenlanders from the twelfth to the fifteenth centuries. From the sixteenth century onward, English and Danish explorers followed by primarily Dutch whalers met the Inuit on the west coast of Greenland. In 1721, Greenland was colonized from the double monarchy Denmark-Norway. During the eighteenth century, permanent settlements were established throughout west Greenland, and in the nineteenth century contacts were established with the Inuit on the east coast and in the Thule area.

EARLY CONTACTS: ELEVENTH TO FIFTEENTH CENTURIES

It took the Eskimologist Erik Holtved by surprise when, in 1936, he excavated six ruins on the little Ruin Island off the coast of Inglefield Land in the Thule district and found Norse objects more than 2,000 kilometers north of their western settlement. The investigations at this site, which Avôrtúngiaq had found in 1917 as a member of Knud Rasmussen's Second Thule Expedition and had mentioned to Holtved, added a new chapter to the pre-history of Greenland. In the thirteenth century A.D., the northwestern part of the island had been settled by Inuit whalers, and among the hunting equipment found there were objects similar to types from the Punuk culture—a Neoeskimo culture existing in the Bering Strait region in the period ca. A.D. 1000. From here, the culture's elements spread eastward to Greenland, with the new settlers to the Smith Sound region now known as the so-called Ruin Island phase of the Thule culture (Holtved 1944 II:149–156).

Holtved's discovery raised the question of whether the Norse had been this far north. He himself believed this was possible, but without any traces of ships, he had to conclude that the Norse objects had been brought to Thule from southerly regions by the Eskimos themselves. Holtved continued his investigations in the subsequent decade, and his new findings of ruins from the Ruin Island phase increased its geographical distribution, covering the whole Thule district. However, these more comprehensive materials gave him no reason to revise his conclusions about the presence of the Norse (Holtved 1954).

Three decades later, Canadian archaeologists again raised the question in connection with field campaigns on the west coast of Smith Sound, where house ruins of the Ruin Island type were excavated and dated to the thirteenth and fourteenth centuries. In these houses several Norse objects were found, so that the ruins on Holtved's isolated Ruin Island, off the coast in the northern part of the Thule District, could now be connected with the settlements on Ellesmere Island (McCullough 1989). Among the finds were iron rivets, interpreted as ship rivets, and these led the Canadian archaeologists to advance the theory that one or more ships had been icebound in the High Arctic waters and had provided local natives with metal and exotic objects. Among finds of Norse origin were fragments of woolen cloth similar to pieces that had also been found on Ruin Island and that could be remains of sails.

Today, Holtved's Ruin Island phase constitutes an archaeological assemblage representing an early period of the Thule culture in High Arctic Canada and Greenland. Canadian archaeologists named the people of the period as the Ruin Islanders on the assumption that they represent early Thule culture pioneers. It is these newcomers Holtved and later researchers refer to when focusing on the possible contact between Norse and Native Greenlanders. However, one has to wonder how it is that many objects from the Ruin Island phase exist in an almost unchanged form far from their prototypes around the Bering Strait, and how indeed were lamps and pots made of clay, a material that in the eastern Arctic is unsuitable for pottery, transported unbroken during their travels eastward to the Smith Sound region. These circumstances support the assumption that the journey from Alaska through the Canadian archipelago, with its relatively poor resources, took place over a short period and that the so-called pioneers must have been informed earlier about their distant destination before beginning to move to the east.

Such thinking gave rise to the idea that a third agent might have prepared the way for the Neoeskimo pioneers: the Dorset Paleoeskimo population in central and eastern Arctic (Gulløv and McGhee 2006), the latest of the Paleoeskimo cultures known from the Smith Sound region (Appelt and Gulløv 1999; Schledermann 1990). On the Greenland side of the sound, investigations carried out in the 1990s revealed a Late Dorset winter site with five to six dwellings having a quadratic ground plan. Nearby was a large rectangular megalithic structure with boulder walls and with a row of fireplaces down its midline axis, which is thought to have had a shamanic function (Gulløv and Appelt 2001). Today, four such megalithic structures, known as "longhouses" in the remainder of the eastern Arctic, have been identified in Greenland, where they seem to have been used as late as A.D. 1200; some of the other dwellings were still inhabited around A.D. 1300 (Appelt and Gulløv 1999; Darwent and Johansen 2010).

Among the abundant artifact materials from the Late Dorset site are small, delicate ivory carvings of animals and considerable amounts of meteoric iron brought to the site from their meteoric source near Cape York ca. 400 kilometers to the south. Finally, a fragment of a brass pot of Norse origin was found, of a type produced in northern Europe before A.D. 1300. In addition, objects from the Thule culture appeared in the Dorset site, including an arrowhead of antler found in one of the excavated ruins and dated to the twelfth century (Gulløv 2008).

Based on these archaeological materials, three ethnic groups have been identified as occupying the High Arctic Smith Sound region: the Neoeskimo Thule culture that emerged in the second half of the twelfth century as the Ruin Islanders, the Paleoeskimo Dorset culture, still apparently present in the fourteenth century, and the Norse, represented by objects from the thirteenth and fourteenth centuries, found in ruins of both of the Native cultures. However, the Norse objects alone do not support a conclusion of Norse presence so far north. To refine these interpretations we have to look closer at the archaeological circumstances, and bring the Dorset culture into focus, as it had been present in the region long before the other ethnic groups appeared. In spite of intensive investigations of this culture, the distribution of which covers large parts of the Eastern Arctic, archaeologists have not yet succeeded in finding dog bones or remains of the mode of transport used, with the exception of sled shoes, and in this respect Dorset culture differs from the above-mentioned newcomers with their more mobile cultures. Furthermore, as Late Dorset sites have not yet been found further south in west Greenland, we may assume that the Norse objects from the Dorset winter dwellings, such as the fragment of a brass pot, are evidence of direct contact in the far north at least once in the thirteenth century.

Among the terrestrial fauna material identified from the Late Dorset period (Bendix 2000; Darwent and Foin 2010), fox bones make up more than one-third of the zoological finds, stressing the importance of foxes as a coveted resource. As many as 500 years would pass before foxes were of similar importance in Greenland, due to European demand for fox skins in the eighteenth century (Gulløv 1997:404). While we don't know the importance of fox skins among the Dorset people, the high bone counts indicate they were valued.

Walrus bones, which make up just under one-third of the identified mammalian species, are assumed to represent a large amount of the available meat (Bendix 2000:78–80). These circumstances make it probable that the walrus, as known from other sites in the eastern Arctic, was an important and perhaps the most important prey for Dorset people in many regions (Murray 1999).

For Norse society, Arctic ivory was much coveted and the wealthiest farmers regularly organized hunting expeditions north of the settlements to obtain walruses, which were found in two populations on the west coast of Greenland (Muus et al. 1981:407). The first location is on the central west coast around 67° N where the so-called West Ice from Canada reaches the Greenland coast and where the Neoeskimos first settled in the fourteenth century; the second location is north of Melville Bay, which until the thirteenth century, it seems, was not crossed by the Native Greenlanders of the Smith

Sound region. After the Norse *landnám*, in A.D. 985, more than 200 years passed before Norse hunters met other peoples in the country—unless they earlier had discovered the rich hunting grounds further north. This possibility appears likely if we identify the contemporary Paleoeskimo Dorset culture and the new Neoeskimo people, ancestors of the Inuit, as active agents in the reconstructed scenario.

The archaeological material from the thirteenth and fourteenth centuries, including Norse objects found in Inuit ruins and Inuit objects found in Norse farms, suggests closer or more frequent contact between the two ethnic groups than has previously been assumed. The question of where and how such a relation took place is first and foremost based on a well-founded assumption that the contact had a purpose and thus can be described as positive, that is, that it had formed the basis for some sort of exchange profitable for both parties. To get a closer view, one has to first evaluate the character of the objects found, and then look at the ethnic groups in their geographical contexts.

It is obvious that the meaning of an object changes character when forming a part of a cultural context different from its original one. The Norse chessmen found in the Neoeskimo Ruin Island phase (Holtved 1944 I: 300) can be mentioned as an example, as chess had never existed among prehistoric Arctic cultures. A similar case is the side prong of a Neoeskimo bird dart found in a farm in the Norse Eastern settlement (Gulløv 2008:19), in a culture that never in Greenland used such a hunting implement. On such occasions, the meaning of the object changes from utility value to sentimental value as documented in written sources from seventeenth- and eighteenth-century west Greenland, when European whalers and merchants appeared. At that time, the traditional, internal Inuit trading partnerships also included Europeans, and the meaning of trade goods, such as copper pots, were soon realized to be useless as compared with Inuit soapstone pots, but subsequently changed to become objects expressing prestige when cut up into pieces and used as amulets and items of personal ornament, for example, as pierced sheet copper served as earrings (Gulløv 1997:208). Thus, trading partnerships became part of an economic institution suitable for a direct analogy to the situation 300 years earlier (Gulløv 1997:402).

As a result of these considerations, the contact between the Native Greenlanders and Norse society can primarily be described in economic terms, including the exchange of goods of both sentimental value and utility value. They first confirm the trading partnership and subsequently serve as amulets. An example of that kind of use is seen in a piece of Norse oak from the thirteenth century, inserted in the gunwale of a fifteenth-century umiaq found in Peary Land. The use of amulets in vessels to secure against capsizing has analogies in ethnography from both west and east Greenland (Gulløv 1997:433).

The second value may relate to the direct use of the objects exchanged, in particular when metals were in demand. Metal is often to be found among Norse objects in Inuit contexts. Meteoric iron from Cape York in the Thule district was also included in the exchange, and a weapon point made of this material was found in a Norse farm in the Western Settlement dated to the fourteenth century (Buchwald 2001:59). Other finds of Inuit origin found in this settlement include a marline spike of walrus ivory, ornamented

in Neoeskimo style but having a gouged-out suspension hole cut in Paleoeskimo style (Gulløv 2008:19). Finds with characteristics like this have been excavated in the Smith Sound region where the two Native Greenland cultures coexisted for a period of ca. 150 years, creating the basis for acculturation seen in tools and hunting implements (Gulløv 1997:448).

Metals of Norse origin, such as iron, copper, and brass, have been found at several sites in the eastern Arctic, but the greater number are from Inuit sites on the western side of Greenland north of Smith Sound and in eastern Ellesmere Island. The regional distribution shows an increasing frequency in the north, but also a larger amount occurs in south Greenland, where metal originates from the post-Norse Inuit settlements when scavenging of objects from abandoned Norse farms created the basis for the inter-regional trade of metals, including pieces of metal from Norse church bells (Gulløv 2008:20). However, focusing now on the Early Thule culture including the Ruin Island phase (A.D. 1200–1400) when the Norse settlements still existed, it becomes clear that the regional distribution of finds supports the assumption of an early interest in metals that were brought north to the Smith Sound region. Much of this fragmented metal has never been analyzed (Gulløv 2008).

Many European finds have come from Inuit ruins of the Nuuk district from the seventeenth and eighteenth centuries, when contact with Europeans was prominent and well recorded, especially after the Danish-Norwegian colonization in 1721. Among 956 objects of European origin are 218 objects (22 percent) made of metal, suggesting that a similar amount of European contact might have taken place further north 400 years earlier (cf. Gulløv 1997:429).

In the farthest north and in the southernmost part of thirteenth- and fourteenth-century Greenland two different ethnic groups were present, Native Greenlanders and the Norse, respectively, and encounters between them may have taken place either by mutual visits or at places midway between their settlements and sites. Both are possible. The presence of the Norse north of Melville Bay has been under discussion since the first finds of Norse origin from the Ruin Island phase appeared in the 1930s. Today the Norse objects found in structures dated to the semisedentary Dorset culture give us strong evidence to support this possibility of a northern Norse presence. Furthermore, it can no longer be taken for granted that the pieces of woven woolen cloth found in Ruin Island phase ruins were parts of sails; on the contrary, they may be fragments of tents. It is known that discarded sails were used for cover by Norse hunters during their long journeys 2,000 nautical miles north of the settlements, when they had to camp for shorter or longer periods, depending on weather, wind, and the taking in of supplies. A new description of all extant Greenland textiles provides context for such a discussion (Østergård 2003:118).

In the fourteenth century, the Neoeskimos expanded their winter sites southward into west Greenland and reached Disko Bugt, a region rich in resources that was part of the Norse sphere of interest and was well known in Norse topographical description. These descriptions include localities north of the Norse settlements, and some place-names can be identified, such as Greipar, the coast around 67° N, where walrus haul out on

land. Karlsbúðir was also located in that area. Further north was Bjarney—today known as Disko Island. Króksfjörður (i.e., the crooked fjord) may be Vaigat Sound between Disko Bugt and the open sea. On both sides of Vaigat one finds the landscape known as Króksfjarðarheiði, that is, the “flat, waste heath by the crooked fjord,” which describes the flat-topped mountains of horizontally bedded rock on Disko Island with Vaigat Sound to the north, and can be identified by its geology. Here lies Eysunes, which means the “glowing or smoldering peninsula.” This refers to the coal- and oil-bearing slate strata on the Nuussuaq Peninsula, which combust from rockfall impacts. From Disko Bugt, where the Norse hunters had their booths (tents), the hunting trips began north to Norðrsetur, that is, the northern hunting grounds, passing Snæfelli near Svartenhuk, and continuing into the Hafsbotn, or Melville Bay (Gulløv 1997:432).

Thus, the northern hunting grounds and Disko Bugt were the most plausible localities at which the Norse may have met Native Greenlanders. In this region, figurines carved by Native Greenlanders representing the Norse in their garments have been found, and some of these are rendered in such detail that they may have been carved from life (Gulløv 2008:21). Among these are figurines representing Norse women, whom the Native Greenlanders may have met during visits further south, as it seems unlikely that Norse women traveled so far north (Figure 38.1). From recent excavations carried out in the Herjólsfnes region in the southernmost part of the Eastern Settlement, we now know that such Inuit visits to the south did take place. On some sites summer dwellings have been found, including one close in front of a large farm, and dates for the Inuit as well as the Norse structures demonstrate their use in the second half of the fourteenth century, showing also that the Herjólsfnes graveyard was still in use in the first half of the fifteenth century (Jensen et al. 2011:33).

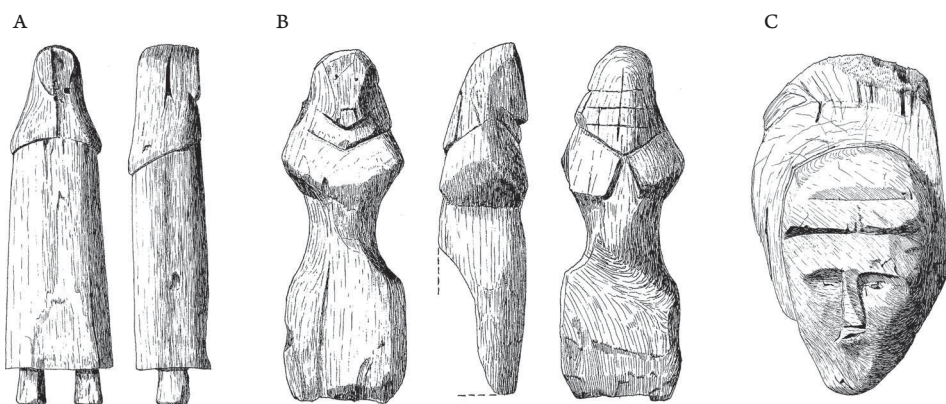


FIGURE 38.1 Some of about a dozen Greenland Inuit-made wooden figurines representing Norse. (a) A man with separate headgear from Aasiaat, Disko Bugt, 5.8 cm; (b) a person, presumed to be a woman, with separate headgear (hair?), collar, and long suit, from Upernavik, 5.5 cm; (c) portrait of a Norseman from Upernavik with pronounced features, perhaps with headgear, and the pupils indicated with small pieces of black baleen, 6.3 cm. National Museum of Denmark, Copenhagen.

Drawings by Hans Christian Gulløv.

Today we can maintain that contacts between the different ethnic groups may have taken place at various localities along the western coasts of Greenland, attested by artifacts found in both Inuit and Norse settlements. Among the Inuit objects found in Norse farms, some date to the Ruin Island phase. These were either taken to the farms by hunters returning from Disko Bugt or Norðrsetur, or they could have arrived with Inuit summer visits to the Norse homeland. It may be assumed that the purpose of the contacts was the direct exchange of metals for Arctic ivory in the form of walrus tusks and narwhal teeth which took place in the far north where the Norse had been active for a long time. Here we find the so-called Bear Trap, a solid stone construction on the western point of Nuussuaq Peninsula, marking the beginning of Norðrsetur and which has been convincingly interpreted as a thirteenth-century Norse storehouse for walrus tusks and narwhal teeth (Appelt and Gulløv 2009:304; Meldgaard 1995).

However, no instance of the exchange of goods, like that for which we have evidence in archaeology, exists in the few written sources preserved. On the contrary, the note in *Historia Norvegiae* of an encounter with the Skrälingja in the far north describes that when they were hit with Norse weapons their wounds became white, without blood, and when they died they did not stop bleeding. The Skrälingja are also said to lack iron. The observation, probably written in the twelfth century, gives us good reason to assume that the Skrälingja mentioned may have been Paleoeskimo Dorset people. The next encounter noted is an attack of Skrälingja, mentioned in the Icelandic annals from the year 1379, when 18 Norsemen were killed and two boys enslaved. In this particular case the Skrälingja must have been Neoeskimos related to the Ruin Island phase (Gulløv 2008:21–22).

It is noteworthy that just these two episodes are mentioned, as no similar ones are noted in the intervening centuries when the object exchanges occurred. In addition, there are several examples of conflict-accentuating episodes in later historical sources from the sixteenth to eighteenth centuries, when Europeans again appeared along the Greenland coasts, and the reason then often concerned the enrichment of one party at the expense of the other, such as theft, or a negative reciprocity, such as exchange or lack of exchange, in terms of economic anthropology. This kind of contact often led to murder or instigated a violent conflict, and in such cases we have several direct analogies to the Norse episodes mentioned (Gulløv 1997, 2008).

Even though the contact between the two ethnic groups can be shown in contemporary archaeological finds, and even though certain Norse types of objects, such as spoons, tub staves, and writing implements or so-called styli, became incorporated in Greenland's Thule culture, nothing indicates an economic dependence between the two peoples. The reason why these contacts never became formalized, as for example between Norse society and the Sami communities in Scandinavia (Gulløv 2008; Price 2000), is that the economies in these two societies were basically incompatible. The Norse farming society had all its institutions imported from Iceland, including the placing of the church apart from the farms, making it economically dependent on the North Atlantic connections (Arneborg 2000). On the other hand, the animistic Inuit hunting communities were integrated parts of the Arctic environment and had an economy

controlled by the right to use the living and nonliving resources and the establishment of trading partnerships, as it can be read the seventeenth- and eighteenth-century sources describing European barter (Gulløv 1997:406–407, 2008). It was only through the economic dimension that contact between the two quite different societies could take place, for example, by establishing trading partnerships, which included the exchange of both gifts and goods. From the types of exchanged objects represented in archaeological finds from the thirteenth and fourteenth centuries, a generalized and a balanced reciprocity can be faintly seen in the respective occurrence of gifts and goods.

As far as different views of the rights of use are concerned, there was potential conflict over prescriptive rights to hunting grounds common to both parties. In the Norse world view, a clear differentiation existed between the socialized “inside” and the wild “outside,” between the inhabited and uninhabited, between controlled society and constrained nature. To the Norse, the *Skrælingja* belonged to uninhabited wild nature and were not subject to “the law of payment for homicide including murder committed in the northern hunting grounds until the North Star where the sun no longer shines” (Arneborg 1997). This differentiation between society and nature was nonexistent in Inuit hunting society, where social structure and technology were integrated parts of the Arctic environment and were manifested through established social relationships and contracts (Ingold 2000:290). So if potential conflicts between Norse and Inuit were to be avoided, the establishment of Inuit winter sites, as shown in archaeology, would have taken place within the abandoned Norse settlements, and after agreement Inuit were able to obtain a traditional right of use.

The reasons why the Greenland Norse era ended and the settlements were abandoned arose from the interaction of several circumstances. Simultaneously, conditions in the local environment, in the surrounding region, and in the broader North Atlantic world, changed to such an extent that the social and economic structure of the society could no longer be maintained. As a result, Norse that had remained in Greenland chose to leave the country. The final decision may have fitted in with both the Norse and Inuit philosophy of life (Arneborg 1997). The social institutions of Norse society did not seem to be able to handle the encounters with the native Greenlanders, while Inuit communities, on the other hand, had rules for contacts with other groups. Therefore, the only possible form of formalized interaction was barter based on partnerships. This explains the distribution of objects brought home: in Inuit communities they attained new social and religious meaning and prestige value, while in Norse society, objects did not hold those meanings, and priority was given instead to securing coveted commodities such as ivory.

McGhee’s theory (1984:21) that the contacts, estimated from the quantity of excavated objects, had been sporadic and opportunistic should not be presumed. Compared with the relatively modest number of European objects in eighteenth-century Inuit contexts, when wide-ranging barter took place, we can assume that similar formalized economic intercourse between Norse and Native Greenlanders in the thirteenth and fourteenth centuries existed to a certain extent. In this connection, there are convincing linguistic arguments for the memory of past interactions still extant in West Greenlandic. Here we find the old designation of a Greenlander, *kalaaleq*, which from an etymological point of view

cannot be of Greenlandic origin but is assumed to be derived from the Norse *klæðast*, i.e., those who wear (skin) clothing (Gulløv 2000), and “they told that this designation was introduced by the old Christians, who earlier lived in their country” (Egede 1750:68). Today, the country is named Kalaallit Nunaat, which stands for “Land of the Kalaaleqs.”

INUIT-EUROPEAN INTERACTIONS FROM THE SIXTEENTH TO THE EIGHTEENTH CENTURIES

During the 300 years from the end of the Norse era in the fifteenth century to the Danish-Norwegian colonization of the country in the eighteenth century, Europeans did not establish permanent settlements in Greenland. This was the period of European exploration and discovery, during which the Englishmen Martin Frobisher and John Davis both landed in southwest Greenland in the 1570s and 1580s, when they were searching for the Northwest Passage. In the seventeenth century, Danish kings sent ships to northern waters to maintain their proclaimed sovereignty over Greenland, and from the second half of the century they were competing with Dutch whalers who regularly went to the whaling grounds off west Greenland, in the so-called Davis Strait. From these sporadic summer visits we have written sources documenting encounters with the Inuit, as well as a few archaeological artifacts to testify to the contacts.

When Martin Frobisher in 1578 landed somewhere on the southwest Greenland coast he saw in a tent “a boxe of small nayles,” and commented that “they have trade with some civill people, or else are in deede themselves artificiall Workemen” (Frobisher 1867 [1578]:233). He probably landed in an area which today lies within Nuuk district and in a toolbox there saw, among other things, nails either of Norse origin or derived from contacts with Breton or Flemish sailors. A parallel to the object described can be found in an iron nail set into a wooden handle from a sixteenth-century archaeological context (Gulløv 1997:391). Nothing further can be concluded from this single, isolated source, which also describes the owners of the small box as ingenious craftsmen.

On his second journey to Greenland in 1586, John Davis arrived at Gilbert Sound, identical with Nuuk Fjord (Bugge 1930), which he said lies at 64° 15' N. On the north side of this coast he noted: “Wee also sawe their houses neere the Sea side, which were made with pieces of wood on both sides, and crossed ouer with poles & then couered ouer with earth; we found foxes running vpon the hils; as for the place, it is broken land all the way that we went, and full of broken Islands” (Hakluyt 1589:788). Nothing is said about the shape of the dwellings, but he did note that much wood had been used in their construction. This is thus a remarkable description, which specifies a locality and emphasizes the large amount of driftwood which was found on the coast and was used as building material. Davis had already in 1585 wondered at the “reasonable quantitie of wood, both firre, spruse and iuniper,” which he saw everywhere in the area and which he presumed to grow further inland (Hakluyt 1589:778). The archaeological excavations at the locality confirm

Davis's observations, including the presumed slipway mentioned in his report from the same locality in 1587, where he noted "the Sauages came to the Island where our pinnace was built readie to bee launched, and tore the two upper strakes, and carried them away onely for the love of the iron in the boords" (Gulløv 1997:89–90; Hakluyt 1589:789–790).

For a description of Inuit technology in sixteenth-century Greenland, the best starting point can be found in John Davis's landing on the west coast seven years after Frobisher (Gulløv 1997:392–393). "Javelins" are mentioned in 1585 and "spears" in 1586. No doubt these were harpoons, but they may also have been bladder darts, bird darts, and perhaps lances. "Bows" and "slings" are mentioned in 1586. The descriptions may be deduced from the archaeological material from the locality (Gulløv 1997). "Fishing nets of baleen" and "fishing implements" are mentioned in 1586 and may be corroborated by the excavated knots of baleen and a halibut hook (Gulløv 1997). Among means of transport only the kayak is mentioned, but in large quantities: "10 kayaks," "37 kayaks," "bought five kayaks," and "oars" are mentioned in 1585. In the following year he saw "100 kayaks approaching, sometimes 40 and 50" and "images of idols on their boats." This can only partially be corroborated archaeologically by finds of side stringers, gunwale stakes, crossbeams, and oars (Gulløv 1997). In 1586, he saw a firedrill being used and a knife used in self-defense, and these men's tools are corroborated by a firedrill hearth, and endblade and sideblade knives (Gulløv 1997). "Tanning tubs with sealskin in them" are mentioned in 1586, and we must presume these are coopered items, as the usual wooden bowls and whale-bone dishes are too shallow for that purpose. Tub staves were found at the locality in sixteenth-century context (Gulløv 1997). Among the personal equipment "boots, trousers, mittens and birdskin fur" are mentioned in 1585, but there is no archaeological evidence for these (Gulløv 1997). In 1585, Davis saw the drum and the drumstick in use immediately upon his arrival at 64° N, and later that year he observed "carved wooden idols" in the tents and noted "images of idols on their boats or carried on their persons." We might be tempted to interpret the small dolls that we call toys as such idols. There is some indication that the fittings on the kayak deck were also carved into shapes resembling humans. The idols which they carry "on their persons" must clearly be amulets. A drum handle as well as amulets and dolls are corroborated by archaeological finds from the locality (Gulløv 1997). Davis also observed the fine craftsmanship of the objects he saw and, like Frobisher, he was struck with wonder. There must be "several artists among them," he noted in 1585 and the following year he remarked that "they make all their things very artfully" (Gulløv 1997).

The next documented visit by Europeans took place in 1605. In this year King Christian IV sent an expedition under the captainship of James Hall. The observations were made at 66° 30' N in the present-day Itilleq Fjord and are as follows, "on the ninth in the morning our captain and the captain of 'The Eagle' went on their boats up in the fjord, where they saw their winter-houses, which are built of whalebones with beams of whale ribs and above covered by earth, and they had square vaults or cellars below the ground, dug nearly two yards down into the field. The number of these houses was forty odd" (Gulløv 1997:91). This description of ribs and jaw-bones of whales being used instead of wood contrasts with John Davis's, which does not mention this building material.

Like Frobisher and Davis, the first impression was again that “although it is a savage people, yet they make everything admirably with their expert knowledge” (Gulløv 1997:393). However, the objects brought back from these expeditions are of special interest, because it is the first time they can be dated, to 1605 and 1606. These include an ax and a knife which Hall brought back in 1605 after he had met the west-coast Greenlanders, three of whom came back with him (Figure 38.2). The objects were presented by King

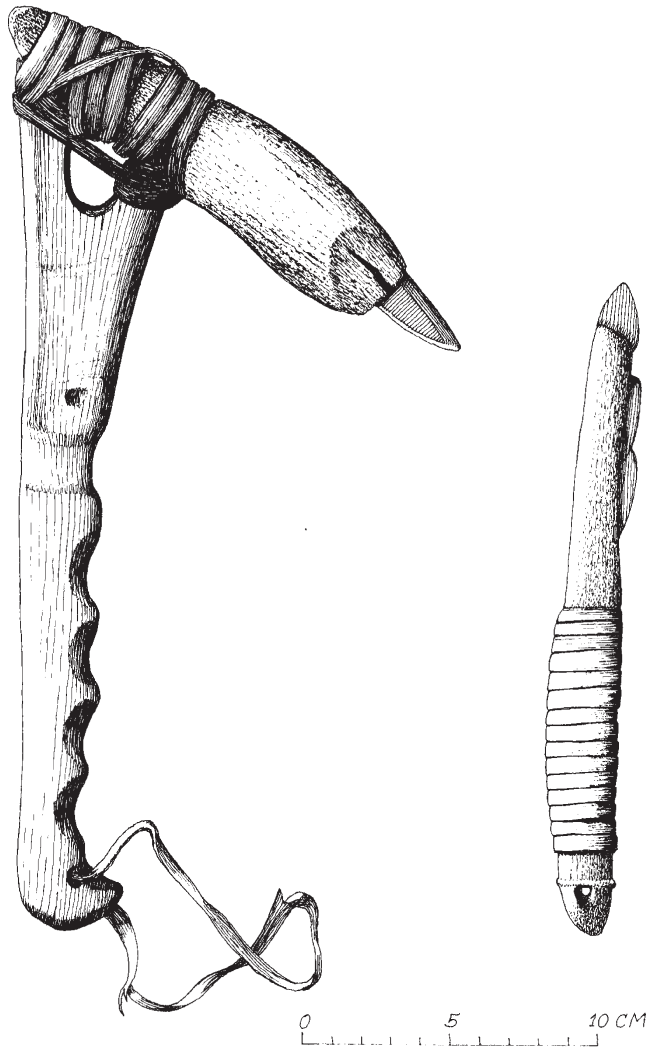


FIGURE 38.2 Objects presented to the Elector of Saxony in 1605 by King Christian IV. The ax is made of driftwood with a whale bone head, lashed on with willow root, and with an iron blade. The knife is of caribou antler bound with willow root and has three pieces of iron set in a groove. The iron has been analyzed and contrary to expectations it was not meteoric. There is no evidence of its origin, but it may be telluric or European. Museum für Völkerkunde, Dresden.

Drawings by Hans Christian Gulløv

Christian to the Elector of Saxony's cabinet of curiosities and are now in the collection of Dresden Museum für Völkerkunde (Israel 1982:57–58). In the *Schiffergesellschaft zu Lübeck* there is also a kayak from 1606, which is in good condition after being restored in 1978, and which is clearly a west-coast type with straight stem and stern. This type differs from the later kayaks which developed upcurved stems and sterns, but it is known from a precolonial burial some 70 km north of Hall's landing (Petersen 1986:48–49, 56).

The European interest in narwhal tusk was very evident in 1605, when the Greenlanders brought "many horns" to the expedition. John Davis had also been aware of this unique commodity¹⁸ years earlier. Thirty years after Hall's second expedition, the Copenhagen Greenland Company also brought back "a good deal of narwhal tusks" (Gad 1967:282). The "unicorn of the sea" was highly prized at European courts in the seventeenth century, and the demand could be met by the west Greenland Inuit, who were also ready when the next expedition arrived (Bencard 1989).

In 1652, David Danell, sent by King Frederik III on the first of his three expeditions, arrived at the location described by James Hall, where he noted, "some of their houses which they had left, and they stood deserted, and they had dug somewhat in the ground and then whale's ribs and some pieces of wood had been laid across, and they were hollow as a large baker's oven and roundish and there lay earth and sods over them with which they had been covered" (Gulløv 1997:91). Thus, even 50 years after James Hall's visit, the Inuit dwelling form is unaltered, and we also learn from Davis's report that the building material at 64° N is wood, while whale bones were preferred at 66° N. While most of Danell's local observations were made in the area around 66° 30', a few can be related to Nuuk Fjord, where he was in 1652, 1653, and 1654. There is no direct information from the latter year, but we do know that he penetrated some distance into the fjord and there captured four Greenlanders, whom he took back to Europe. It is the evidence of those Greenlanders, as told at Gottorp Castle in Schleswig, that has become our main source for Inuit lifeways in seventeenth-century west Greenland (Scheffel 1987).

The Inuit who came from south and north to trade with Danell could receive knives, scissors, axes, sewing needles, nails, pins, awls, scythes, linen bands, glass beads, and mirrors, while he himself primarily looked for narwhal tusks. In 1653, "around 80 Greenlanders came on board with all manner of goods, but not with as many unicorn horns as last year," but "on 70 degrees there are said to be many whales and walruses, of which our people bought teeth, but our people could not get up there, for it was too late in the year" (Gulløv 1997: 395).

Danell's observations became the last ones from the seventeenth century that described the material culture of the Inuit and the people themselves. In the following decades, European whalers, primarily Dutch, expanded their commercial whaling activities from Spitzbergen and Greenland Sea waters to Davis Strait, which resulted in heavy travel and trade activity among Inuit societies throughout west Greenland. When a permanent settlement supported by King Frederik IV became a reality with the construction of the trading and mission station at 64° N in 1721, the colonists could every year see hundreds of Inuit passing the colony in umiaqs and kayaks on their way northwards to the whaling grounds to barter with the Dutch (Gulløv and Kapel 1979). The

head of the mission, Hans Egede, brought with him maps and books, one of which was published in 1720 by the Dutch whaler Lourens Feykes Hann, whose observations were made on journeys to western Greenland over a period of 10 years. The following passage from Hann's book is the first description of west Greenland winter houses made since the time of Danell.

The houses they make of rocks and mixed with earth, which they build up into a wall, 2–3 feet thick and 4–5 feet high, but quite flat on top, so that one generally runs across it. The length of their houses varies and they are built according to the smaller or greater number of house-companions, who are to live in them, and various houses are inhabited by 3–4 house-companions [i.e., adult male members of a family]. The roofs of the houses are made, in the absence of wood which is often the case, of ribs and jaws of the whale, but also of battens, when such are available, which they lay across the walls, as one does here with the beams, and under each beam at the center a support, in order thus to prevent the beams from bending or collapsing, and they then further cover the roofs lengthways with pieces of wood, as many as they think are needed, which they seal with lumps of earth, so that a fairly good and strong, firm, waterproof building is obtained. In the buildings or houses there is only one room or small chamber, where they mostly always eat, sleep, and keep house together. (Gulløv 1997:92–93)

Hann's description is the first time a communal house is mentioned in the written sources about Greenland. The wood mentioned in connection with its construction is no longer as abundant as it was when John Davis made his observations 125 years earlier. Hann writes that in the summer they "leave their houses, whose roofs they largely break down or demolish, in order to take the wood with them to use in another way," a description which can be archaeologically demonstrated on sites contemporary with his observations (Gulløv 1997:92–93).

Half a century after the colonization, Otto Fabricius, who was a pastor in southwest Greenland, gives an account of a regular trade in building materials. "North of Nuuk it is said that on an island far out at sea there is a good deal of driftwood, which is still gathered. Otherwise it is found in greater or smaller quantities in the southern part of the country, from 66th degree and southwards, but in Disko Bugt and further north it is not found. Therefore the so-called southerners, who live nearest to Cape Farewell have no shortage of it and have always the best timber in their boats, as well as wood in their houses, which they also trade with the northerners, who have need of it, so that they even furthest to the north of the country must use unicorn horns as 'timber' in their houses" (Gulløv 1997:95).

The change in the dwelling type, from "round baker's ovens," as Danell wrote in 1652, to "large houses with a flat roof one generally runs across," as Hann observed ca. 1700, took place in the course of a very few decades, when Europeans were exploiting the same local resources as the Inuit. Its cause can be associated with external factors, such as European whaling, which increased sharply in west Greenland waters beginning toward the end of the seventeenth century. The greater part of the population then lived

in Disko Bugt and the southernmost part of the west coast, and the increasing travel activity to take part in whaling and bartering had a far-reaching effect on Inuit societies, including those of the southeast coast. Except for the Thule district and northeast Greenland, the communal house was in use throughout west and southeast Greenland as a practical traveler's winter dwelling for the umiaq crews and the kayakers who followed them on their way to the whaling grounds (Gulløv 1997:386–389, 2010; Jensen et al. 2011) (Figure 38.3).

The overriding control over resources and production, to which the population in west Greenland became subject in the eighteenth century, altered the Inuit social network, which henceforth covered smaller geographical units that were associated with

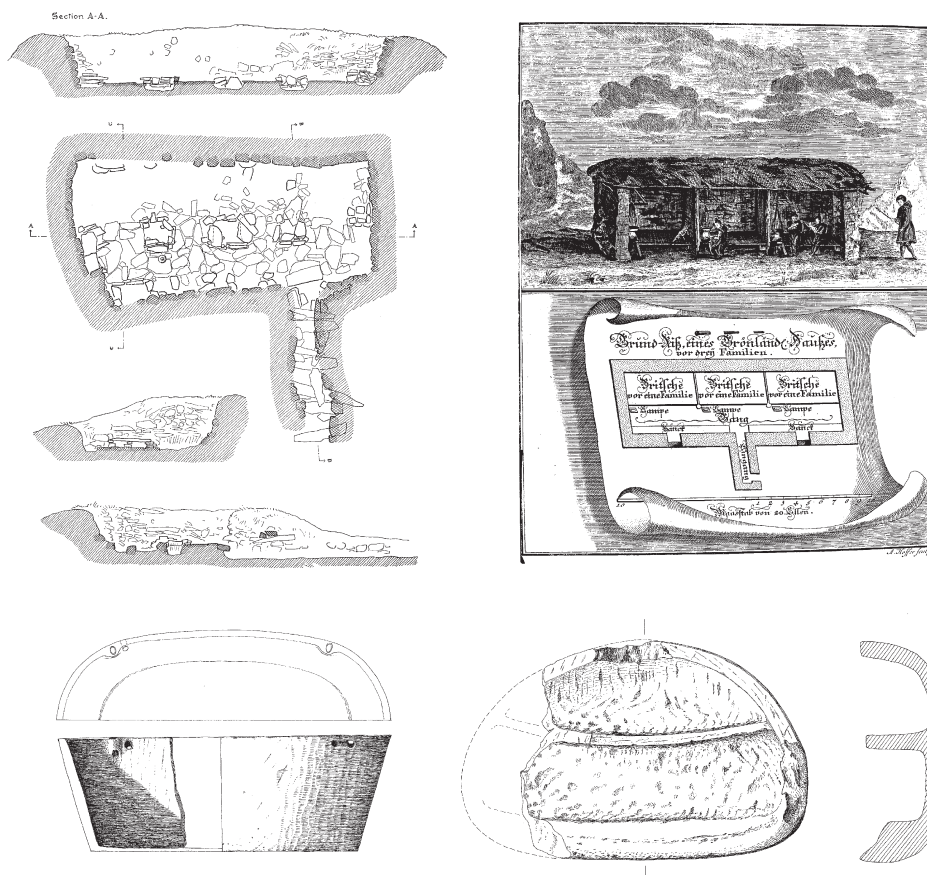


FIGURE 38.3 Excavated communal house from Disko Bugt, and a reconstruction of a communal house from Nuuk made by the German missionary David Cranz in the 1760s. Cooking pot, length 35 cm, and lamp of soap stone, length 31 cm, found in excavated communal houses from 18th century Nuuk region which have the best soap stone quarries in Greenland. The finished products were also exchanged with caribou skin and baleen further north. Greenland National Museum and Archives, Nuuk.

Drawings by Erik Holtved and Hans Christian Gulløv

European trading and mission stations. The causes must be sought in the distribution of available resources in western Greenland, which had been exploited in an established exchange system, based on balanced reciprocity. This system became unbalanced when it attempted to meet an external demand for a tertiary resource, such as fox furs. Migration and trade were important elements in the Inuit hunting community's adaptation to available resources, and they constitute a reference framework for the interpretation of Thule culture objects. When these elements disappear with the colonization of the most remote areas of west Greenland at the end of the eighteenth century, a date can be set for the end of the Thule culture in this part of Greenland. Nevertheless, a Thule cultural identity survived in the Thule area and on the southeast coast even after 1800, despite the influence of mission and trade (LeMoine and Darwent, this volume, chapter 37; Gulløv 2009).

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CHAPTER 39

THE THULE-INUIT SUCCESSION IN THE CENTRAL ARCTIC

PETER DAWSON

THE emergence of historic Inuit cultures from a common Thule ancestry in the Central Canadian Arctic remains an important area of inquiry in arctic archaeology. Yet it has been pushed to the sidelines in recent years, as such questions as the Dorset-Thule succession, Norse-Dorset contact, and the timing of Thule migrations have taken center stage. This is partially due to the plethora of new radiocarbon dates that have recently appeared in the literature, allowing archaeologists to examine these issues with greater chronological precision (Friesen 2004a; Friesen and Arnold 2008; McGhee 2009; Park 1993). With the exception of McGhee (1994), the past two decades have seen little research directed at explaining the Thule-Inuit transition, even though it was a topic of great interest to such first-generation Arctic researchers as Diamond Jenness (1923), Kaj Birket-Smith (1929a, 1929b), Knud Rasmussen (1929, 1939, 1931), Therkel Mathiassen (1927), and Franz Boas (1964 [1888]). All were intrigued by the fact that the Inuit lifeways of the ethnographic present, while highly variable, had seemingly developed from a relatively uniform Thule cultural base. More remarkable is that recently revised dates which push the initial Thule migration forward by several centuries imply the transition was even more rapid than originally thought (Friesen and Arnold 2008:527). The changes occurring during this time reflect the effects of different ecological and social environments on the ancestral Thule culture pattern. The outcome has been the emergence of groups with distinctive seasonal rounds, patterns of resource exploitation, systems of population aggregation and dispersal, and associated ideological and cultural behaviors. Understanding the source and role of these transformational changes in the Central Canadian Arctic is the primary focus of this chapter.

The archaeological record demonstrates that change is inevitable. Sometimes it is desirable, yet, at other times, major transformations can be dramatic and particularly tragic, resulting in human suffering (Hegmon et al. 2008:313). This can occur when

societies become caught in “rigidity traps”—a concept suggested in “Resilience Theory,” where highly structured socioeconomic relations and the suppression of innovative behaviors promote inflexibility and rigidity (Hegmon et al. 2008; Holling 2001; Holling and Gunderson 2002; Holling et al. 2002; Redman 2005; Redman and Kinzig 2003; Walker et al. 2004). Under these conditions, when change does occur, it is often harsh. An examination of the archaeology and ethnography of the Central Arctic suggests that the concept of rigidity traps may prove useful in framing the Thule-Inuit succession in this area. In this chapter, potential causes of rigidity as well as the sources of transformational change are examined.

GEOGRAPHIC DISTRIBUTION

For the purposes of this overview, the geographic distribution of Central Inuit societies during the nineteenth century has been chosen as an appropriate starting place for discussion (Figure 39.1). It was during this period that European encounters with Central Inuit groups became more frequent and some of the earliest records of their lifeways

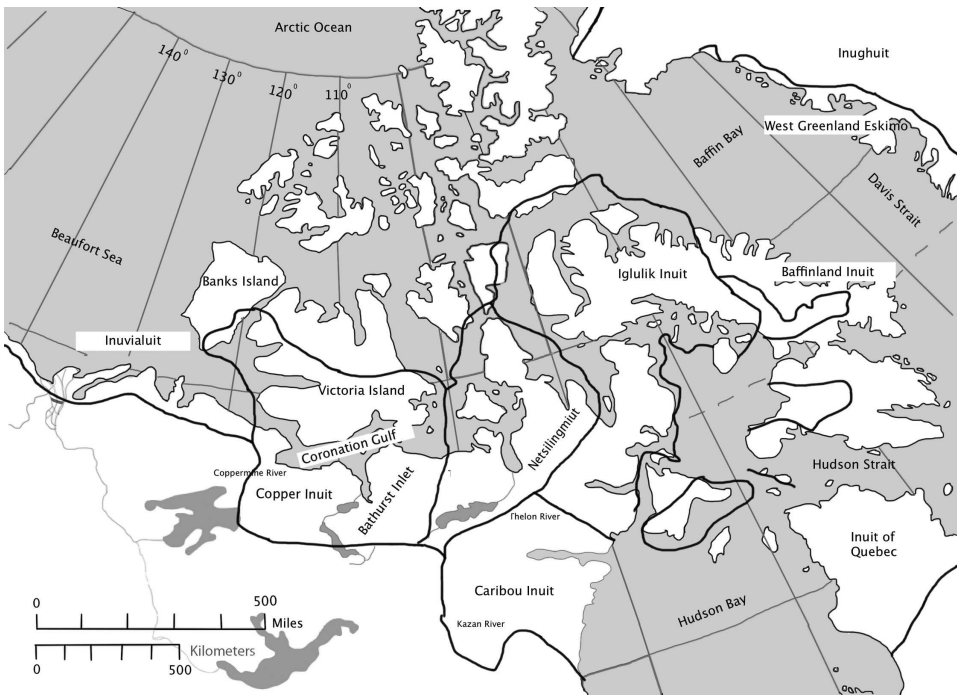


FIGURE 39.1 Approximate geographic locations of Central Arctic Inuit societies discussed in this chapter.

Image compiled by Peter Dawson

were published. At this time, the Copper Inuit (*Kitlinermiut*) inhabited areas to the east of the Coppermine River, including the southern half of Victoria Island, and Coronation Gulf. The Netsilik (*Netsilingmiut*) inhabited areas of Queen Maud Gulf, including King William Island, the Boothia Peninsula, Adelaide Peninsula, and mainland areas around the Back River. Further to the east, the Iglulik Inuit (*Iglulingmiut*, *Aivilingmiut*, and *Tununirmiut*) occupied Melville Peninsula, Baffin Island, and the northern portions of the western Hudson Bay coast. Finally, the Caribou Inuit (*Ahialmiut*, *Akilinirmiut*, *Hanningajurmiut*, *Harvaqtuurmiut*, *Hauniqtuurmiut*, *Ihalmiut*, *Paallirmiut*, *Qaernermiut*, *Utkuhiksalingmiut*¹) inhabited areas of the western coast of Hudson Bay, inland as far as Dubawnt Lake, and as far north as Chesterfield Inlet (Birket-Smith 1929a, 1929b; Csonka 1994, 1995; Damas 1988; Stevenson 1997).

HISTORY OF INVESTIGATION

The professionalization of anthropology and archaeology in the nineteenth century resulted in the study of many indigenous groups in North America, including the Central Arctic Inuit. One of the primary objectives of early research expeditions in this region was establishing the origins of Inuit and Eskimo peoples. In this regard, the Central Arctic was where some of the most significant research into Inuit origins and lifeways was carried out. By way of illustration, Franz Boas's seminal work *The Central Eskimo* is generally considered to be the first full ethnography of an indigenous culture in the North American Arctic (Boas 1964 [1888]). Using a comparative analysis of circumpolar folklore, Boas argued that all Inuit groups had originated in the Central Arctic, and that these cultures had subsequently migrated to the western regions of the Bering Strait (Boas 1964 [1888]). This was based on his observation that the historical ties connecting Northeast Asia to North America were far stronger with the northwest coast than they were with historic Inuit societies.

Like Boas, Danish anthropogeographer Hans P. Steensby supported the idea that the Central Arctic had served as the place of origin for all Inuit and Eskimo groups (Steensby 1916:70). Analyzing the distribution of culture traits throughout Subarctic and Arctic regions of Greenland and North America, Steensby defined two distinctive lifeways: an "Eskimo Summer Culture" and an "Eskimo Winter Culture." He concluded that greater differences existed between Subarctic and Arctic cultures than among Arctic cultures, and that the continuous use of kayaks and other technologies related to sea-mammal hunting, as found in the Central Arctic, were *the* oldest expressions of an Arctic adaptation (Giddings 1967; Steensby 1916:70). Steensby intended that his theories about how Inuit culture developed be treated as hypotheses to be tested using archaeological, ethnographic, and environmental data (Steensby 1916:207). Consequently, they motivated such researchers as Kaj Birket-Smith and Therkel Mathiassen to test and perhaps validate these ideas. Both men were former students of Steensby and members of the Fifth Thule Expedition (1921–1924), led by Knud Rasmussen.

Birket-Smith spent much of his expedition time with the inland-dwelling Caribou Inuit in the Canadian barrenlands west of Hudson Bay. He argued that their reliance on inland caribou hunting represented a “living” example of the earliest Inuit pattern of culture. Sometime in the past, the earliest Inuit cultures had moved to the coast, where they had adapted to hunting sea mammals “on and under the ice of the sea” (Birket-Smith 1929a). As these “Proto-Eskimos” spread eastward and westward along the arctic coast, they became increasingly exposed to ideas from the Bering Sea region. Birket-Smith argued that the inevitable outcome was the ethnographic pattern of contemporary Inuit, with the exception of the Caribou Inuit who had returned to this earlier pattern following a fresh advance of inland-dwelling groups sometime during the historic period (Birket-Smith 1929a, 1929b; Giddings 1956:70).

It was near Repulse Bay on the northwestern coast of Hudson Bay that Therkel Mathiassen carried out excavations at Naujan that would eventually establish that the roots of contemporary Inuit culture lay in an earlier Neoeskimo culture he called “Thule” (Mathiassen 1927). Therkel Mathiassen worked as the archaeologist and prehistorian of the Fifth Thule Expedition. Like Birket-Smith, he was a student of Steensby, but felt more comfortable exploring the concept of adaptation to the natural environment without necessarily agreeing with his teacher’s theories on Inuit/Eskimo origins (De Laguna 1979:70). Mathiassen’s multipronged training in Danish prehistory and previous excavation experience were usefully applied to investigating the Naujan site near Repulse Bay, allowing him to reconstruct a great deal about the lifeways he would eventually identify as Thule Eskimo (Inuit) (De Laguna 1979:21). Using an innovative approach, Mathiassen (1927) widened his investigations to include nearby historic sites occupied by the Aivilik Inuit—a local subgroup of the Central Arctic Iglumiut Inuit who lived in the vicinity of the Naujan site. The Thule materials from Naujan were compared with those recovered from Aivilik sites, as well as ethnographic descriptions of material culture from Inuit/Eskimo groups across the North American Arctic and Greenland, to understand how the Thule material had been transformed into historic Inuit. By comparing culture traits expressed among these disparate sources, Mathiassen (1927) was able to conclude that “in most . . . aspects, the *Naujan* people seem to have passed along their technology and inventions to their *Iglulik* (Inuit) successors” (Giddings 1967:76). For example: “weapons for taking seals and walruses . . . [i.e., harpoon heads, foreshafts, socket pieces, finger rests, ice picks for fitting at the proximal end of the wooden harpoon shaft]” . . . recovered from the archaeological deposits at the *Naujan* Site were “easily recognizable from their close resemblance” to Historic Aivilik and/or other Historic Inuit specimens (Giddings 1967:73). Mathiassen (1927) noted that some culture traits in Thule assemblages that were not shared among historic Central Arctic Inuit groups were present in distant parts of the Arctic to the west—notably western Alaska. These included: baleen sledge shoes, splitting wedges, mattocks for cutting sod, hand drills, meat hooks, winged buttons, hair ornaments, and chains of walrus ivory and bird figures with human foreparts (Giddings 1967:75; Mathiassen 1927).

The subsistence practices of Mathiassen’s Thule people also differed from those of their historic descendants, as was apparent in the harpoon heads and slate endblades

recovered from Naujan that were “much too large” for use in hunting small seals, and which appeared to be entirely absent in historic Aivilik assemblages (Giddings 1967:74; Mathiassen 1927). Similarly, faunal remains from Naujan included the bones of large baleen whales, which also served an important architectural function in the construction of semisubterranean houses. Mathiassen (1927) noted that these whales no longer frequented the waters off shore from the Naujan site, and speculated that “the waters . . . must have been deeper when so many were caught” (Giddings 1967:74). Other examples of artifacts discovered by Mathiassen at Naujan that were not part of either the ethnographically described subsistence practices or material culture of the Central Arctic, but that did parallel specimens known from northwest Alaskan whale-hunting societies, included bladder darts, light bird spears, baleen wolf killers, and bola stones (Giddings 1956:74–75; Mathiassen 1927).

Placing his results in the context of Steensby’s model of Inuit/Eskimo origins, Mathiassen (1927) noted close correspondence between Thule and Steensby’s (1916) Neoeskimo culture. Mathiassen disagreed with Steensby’s concept of “Paleoeskimo,” stating that he had found no evidence to support the existence of a culture older than Thule at Naujan (Giddings 1967:78). Instead, Mathiassen (1927) maintained that Thule culture had developed somewhere in the Bering Strait region ca. 1,000 years ago, and had migrated eastward into the Central Arctic, eventually becoming the “first Eskimos to reach Greenland” (Giddings 1967:78).

THE THULE-INUIT TRANSFORMATION IN THE CENTRAL ARCTIC

Once it had been established that the origins of Central Arctic Inuit groups lay in Thule culture, archaeologists began exploring how and why this transformation had taken place. Most examined this question regionally, focusing on the archaeology of a specific Inuit group. Using the ethnographic record as a baseline, these changes were examined in terms of: (1) social organization, (2) axis of trade and exchange, and (3) technology, subsistence, and settlement. Climate change and intersocietal contact (European and First Nations), either individually or in combination, were cited as potential causes for these observed changes. Important climatic episodes include the Neo-Atlantic (Medieval Warm) Period, ca. A.D. 1000–1300, and the Neo-Boreal (Little Ice Age) Period, ca. A.D. 1550–1850 (Andrews and Andrews 1979; Grove 1988; Lamb 1982).

A. Social Organization

The Thule-Inuit transformation in the Central Arctic is associated with several dramatic shifts in social structure. George Wenzel has stated, “[i]n no small sense, the Inuit

economy is Inuit culture” (Wenzel 2009:93). It is therefore not surprising that many of these changes seem related to the abandonment of whale harvesting—a subsistence activity that provided a great deal of winter food security (McCartney 1980; Maxwell 1985). These shifts involved the development of new social structures associated with the allocation of subsistence goods among individuals, between households, and across entire communities (Wenzel 2009:92). Social hierarchies developed around whaling were replaced with kinship-based behavioral directives based on respect-obedience and solidarity-affection (Damas 1972, 1975, 1988; Dawson 2002; Stevenson 1997). The fact that these behavioral directives vary from west to east suggests that the factors bringing about these transformational changes were experienced differently across the Central Arctic (Stevenson 1997).

Our understanding of Thule social structure is based largely on archaeological data, as well as ethnographic analogies derived from North Alaskan whaling societies, and historic Canadian Inuit societies of the nineteenth and twentieth centuries (Burch 1998, 2006; Sheehan 1985; Whitridge 1999, 2002). Iñupiat whaling groups of North Alaska more commonly serve as a source for analogies because decades of research have revealed that historic Inuit societies were generally smaller, more mobile, and less logistically and institutionally organized than Thule whaling societies (Savelle 1991, 2002; Savelle and McCartney 1999; Whitridge 1999). In North Alaska, communities were organized around *kariyit*—the headquarters of the whaling crew, which functioned as the essential socioeconomic unit (Savelle 2002). Crews were recruited and organized by a wealthy boat captain or *umialiq*. Each of the six to nine members of the crew had a specific role to perform, and membership often served as a mechanism for receiving specific sections of the whale carcass (Whitridge 2002). There is some debate as to how these crews were structured. Some researchers view them as voluntary associations, formed through the establishment of economic and social relationships that crosscut kinship boundaries (Spencer 1959, 1971). Within this perspective, the whaling crew was the ultimate instrument of societal integration. Others view the whaling crew as much more kin-based. In this interpretation, North Alaskan whaling societies consisted of local family segments that were politically self-sufficient and autonomous (Burch 1980). They would band together only under threat of external conflict or conditions of famine. Thus, rather than crosscutting kinship groups, the members of whaling crews were drawn from within a single local family segment (Burch 1980, 1998, 2006).

The archaeological expression of the *Umialiit-Kariyit* Whaling Complex in the Central Arctic has been vigorously debated (Freeman 1979; McCartney 1980; Savelle 1991, 2002; Savelle and McCartney 1999). One of the most contentious issues surrounds Thule winter site demography and its relationship to social structure and whaling success rates in the Central Arctic (McGhee 2009; Park 1997). Some researchers have argued convincingly for evidence of an Alaskan-style social structure among Thule groups on Somerset Island, where exceptionally large Classic Thule sites are seen as representing the remains of continuous winter occupations of 200–300 people, stretching over a period of two centuries (McCartney and Savelle 1985, 1989; Savelle 2002; Savelle and McCartney 1999; Whitridge 1999, 2002). More recently, McGhee (2009) has questioned

these demographic estimates, using radiocarbon dates and total house frequencies recorded at Thule sites in the Central and High Arctic, from A.D. 1250–1450. McGhee views the Classic Thule period as beginning during the thirteenth century and ending just before the fifteenth century. He argues that various regions of the Central and High Arctic were colonized by no more than three or four small bands of immigrants from Alaska (100–200 people) (McGhee 2009:87). By the fifteenth century, McGhee estimates that this initial founding population had risen to between 600 and 1,200 people, roughly corresponding with archaeological data regarding the size and occupational duration of known Thule sites (McGhee 2009:87). These population levels are consistent with those recorded for historic Inuit populations. In the context of McGhee's mid-fifteenth-century estimates of 400–700 people occupying less than a dozen communities, it seems unlikely that an Alaskan-style pattern of social organization could have existed in the Central Arctic.

The onset of cooler conditions, associated with the Little Ice Age during the sixteenth century, is often seen as upsetting the mode of life associated with Central Arctic Thule culture (McGhee 1969–1970; Maxwell 1985). These conditions may have created the perception of diminishing economic security among Thule groups, who appear to have reorganized themselves in ways that better facilitated the allocation of subsistence goods (Wenzel 2009). The *Umialiit-Kariyit* Whaling Complex was replaced with a web of social mechanisms designed to efficiently transfer and redistribute resources such as seal, which had become an important food among many Central Arctic Inuit groups. This emerging socioeconomic network is referred to as *Ningiqtuq*, and it worked in combination with two principal features of Inuit kinship that strengthened the internal cohesion of the extended family (*ilagiit*) (Wenzel 2009:96). These new behavioral directives operated along two axes—one based on respect-obedience (*naalaqtuq*) and the other on affectional solidarity and emotional closeness (*ungqayaq*) (Damas 1975:24; Stevenson 1997:9; Wenzel 1981:86). Together they ordered relations between dyads or paired sets of individuals and were commonly determined by age, sex, generational and consanguinal or affinal ties (Damas 1975:24). Rather than working in opposition, the directives defined by *naalaqtuq* and *ungayaq* were complementary in nature, helping to organize subsistence activities and maintaining the critical flow of resources between individuals, households, and communities (Stevenson 1997:12; Wenzel 2009:92). While some researchers have examined these behavioral directives in terms of kinship (Damas 1975; Stevenson 1997), others have focused on how they functioned in efficiently organizing ecological activities (Wenzel 1981, 2009).

It is important to note that *naalaqtuq* and *ungayaq* directives varied in the degree to which they were stressed among Central Inuit groups, from west to east (Stevenson 1997:12, 47). For example, household organization, leadership, kinship directives, and communal living arrangements increase in rigidity and formality as one moves from west to east (Damas 1972, 1975). Among the Copper Inuit, *naalaqtuq* and *ungayaq* directives were virtually absent. Instead, the autonomy of nuclear families and a strong egalitarian ethic were stressed, and volunteer associations were used to create symmetrical ties between individuals (Stevenson 1997:47). Damas (1972, 1975) considered Netsilik

social structure to be more integrated than Copper Inuit, but less integrated than the Iglulik Inuit. *Ungayaq* bonds were emphasized to a greater extent than *naalaqtuq* bonds, although sons submitted to their father's authority in all aspects of daily life (Damas 1975:18). Further to the east, Iglulingmiut social structure assumed the most internally coherent and integrated form of all Central Inuit groups (Damas 1972, 1975). Here, emphasis was placed on *naalaqtuq* directives resulting in pronounced leadership within both the extended family and the local group (Wenzel 1981)

In summary, the major change in social organization accompanying the Thule-Inuit transformation involved the replacement of the *Umialiit-Kariyit* Whaling Complex with kinship directives emphasizing the efficient allocation of food resources among individuals, households, and communities. Emerging perceptions of economic insecurity, brought about by regionally specific changes in subsistence practices, may explain why these directives (*naalaqtuq* and *ungayaq*) varied from west to east. In the Coronation Gulf region, for example, greater emphasis was placed on sealing during the Classic Thule period. Conversely, in the Baffin Island region, the hunting of large sea mammals, including whales, continued into the historic period.

B. Trade and Communication Networks

Trade appears to have played an important role in shaping Thule and later Inuit societies in the Central Arctic. It provided a means of converting surpluses into markers of status, motivated long-distance migrations into unoccupied regions, and may have even led to the formation of new group identities, as appears to be the case with those societies known collectively as the Caribou Inuit.

In many Central Arctic Thule communities, trade and communication networks were used to convert whaling surpluses into such valued commodities as iron (meteoritic, Norse) (McCartney 1981; McCartney and Mack 1973), native copper (Wayman et al. 1985), ivory, wood, and hides (Whitridge 1999:252). Some materials, like steatite, were acquired via trade because of their usefulness. Other trade items were sought because of their exceptional functional or aesthetic qualities, making them ideal markers for status and wealth (Whitridge 1999:253). Metals such as iron and copper were especially valued as commodities in Thule communities (McCartney 1981; McCartney and Mack 1973; Whitridge 1999). However, the frequency and distribution of metals vary across Thule sites in the Central Arctic. The underrepresentation of copper in Thule assemblages in the Coronation Gulf area, for example, likely reflects the fact that it was highly curated (Morrison 1987, 1991). Such behaviors underscore the value placed upon copper and other types of metal tools by their owners (Morrison 1987). Prior to European contact, iron and native copper were obtained from Coronation Gulf, Victoria Island, and northwest Greenland. Soapstone was also likely traded when unavailable locally (McCartney and Savelle 1989), as was wood. Indications are that Thule trade and exchange systems were extensive in the Central Arctic (McCartney 1981). However, increasing regional diversity in Inuit societies, occurring during the sixteenth and

seventeenth centuries, appears to have resulted in the collapse of these trade networks (McGhee 2009; Whitridge 1999).

With the arrival of Europeans, items such as wood and iron or metal could now be obtained through shipwrecks (Hickey 1984), storage and supply depots, and ultimately trading posts (Fossett 2001; Stevenson 1997). In many cases, these all initiated profound changes among Central Arctic Inuit societies. The abandonment of *HMS Investigator* on Banks Island at Mercy Bay in 1853, for example, created new trading opportunities for the Copper Inuit, many of whom salvaged tonnes of goods and materials from the ship, and a nearby supply depot (Condon et al. 1996; Hickey 1984; Jenness 1923; but see Hodgetts 2013 for an alternative view). This sudden infusion of wealth has been cited as an explanation for the unique aspects of Copper Inuit society (Hickey 1984). These include: extensive use of native copper during the historic period, emphasis on economic sharing relationships as opposed to kin-based ones, the large value placed on egalitarianism and entrepreneurialism, loss of spring basking seal-hunting techniques during the nineteenth century, emphasis on within-group trade, and termination of trade with the Mackenzie Delta Inuit after the discovery of the *Investigator*, the strong sea-land dichotomy among the Copper Inuit, and the importance of ceremonialism and costuming (Hickey 1984; Stevenson 1997).

While the Thule-Inuit transition eliminated some traditional axes of trade and communication, it appears to have realigned others. Jenness (1922) observed that during his time among the Copper Inuit, the main axis of trade was to the east and involved the Netsilik Inuit. Trade to the west involving the Inuvialuit was practically nonexistent. Even so, his examination of archaeological sites (Thule) in the Coronation Gulf area revealed features more closely resembling those of the Mackenzie Inuit than the Copper Inuit who were their descendants (Jenness 1923). Stefánsson had originally proposed the western trade of soapstone lamps from the Copper Inuit area west to Alaska and even Siberia. Revising this idea, Morrison (1991) has argued that soapstone lamps made by Copper Inuit were traded west to Alaska, via Inuvialuit middlemen. In exchange for these lamps, Copper Inuit received Russian-made iron knives (Morrison 1991). While Stefánsson saw this as part of a major trade network with great antiquity, Morrison states that it lasted for only a brief period of time (1840 to the 1860s).

The other great axis of trade and communication in the Central Arctic involves the Caribou Inuit. Historically, the Copper Inuit were fearful of First Nations groups in the Great Bear Lake area, likely due to long-term patterns of hostility. An infamous account given by Samuel Hearne for example, describes a massacre of Copper Inuit by his Chipewyan companions at Bloody Falls on the Coppermine River. Nevertheless, it was through such hostile contacts that Copper Inuit likely learned of European trading posts such as Moose Factory and Fort Prince of Wales. This no doubt motivated them to travel inland to take advantage of potential trading opportunities. Jenness (1923) discovered that regular contact with inland Inuit (presumably the Ahiarmiut Caribou Inuit) took place in areas of the upper Kazan and Thelon rivers (Csonka 1994, 1995). Perhaps the most famous trading spot is the site of Akiliniq, reported to be just west of Baker Lake (Burch 1986; Csonka 1994). The archaeological and historic documentary evidence

indicates that relations between the Caribou and Copper Inuit did not occur in any volume prior to the twentieth century (Csonka 1994, 1995). However, they did increase substantially during the first decades of the twentieth century until famines decimated the Ahiamut, eliminating their ability to make long trading trips (Csonka 1994).

Like the Copper Inuit, the founder societies of the Caribou Inuit were likely motivated by trade to move into inland and coastal areas of the Kivalliq that had been unoccupied since the Thule period (Burch 1978, 1986). Engaging in trade with Europeans at Fort Prince of Wales was a major source of change in late proto- or early historic Caribou Inuit societies (Fossett 2001; Lyons et al. 2010; Walls 2009). In the first case, trade in European goods fractured Caribou Inuit groups into three categories: those that did not travel to Churchill; those that occasionally traveled to Churchill; and those that incorporated travel to Churchill as part of their seasonal round (Walls 2009). This last group is referred to as “Homeguards” by employees of the Hudson’s Bay Company (HBC), and Kivahiktut by the Paallirmiut Inuit of Arviat (Dawson and Lyons 2011; Fossett 2001). The Kivahiktut traditionally occupied areas to the south of Arviat, extending into Northern Manitoba. In the past they traveled long distances to York Factory (Kittigarmut) and to Churchill (Kuuguaq) to live and to trade (Dawson and Lyons 2011; Fossett 2001).

Trade also provided entrepreneurial individuals with opportunities to increase their own status, as well as that of their extended family, thereby setting them apart from others (Walls 2009). It is not surprising that the names of middlemen traders such as Ullebuk Sr., William Ullebuk (Ullebuk Jr.), Wot Wot, the Little Chief, and Qiqut come up frequently in oral history work with Caribou Inuit Elders (Dawson and Lyons 2011; Lyons et al. 2010; Walls 2009). The activities of these men as Homeguards increased their wealth, and elevated their social status in the eyes of HBC traders, explorers, and their own people (Lyons et al. 2010; Walls 2009). Similar individuals existed in all Central Inuit societies of this period (Stevenson 1997).

To summarize, the Thule-Inuit transformation had the effect of eliminating some traditional networks of trade and communication—especially those to the west. At the same time, however, it reoriented other axes of trade and communication inward toward other Central Inuit groups, and inland to where European trading posts were being established. Access to European goods created opportunities for entrepreneurial individuals and their extended families. In some cases, aspirations of wealth and status were quashed, as appears to have been the case with the Copper Inuit (Hickey 1984; Stevenson 1997). In other situations, as with the Caribou Inuit, individuals and their extended families were able to better the material and social conditions of their lives (Walls 2009).

C. Technology, Subsistence, and Settlement

The abandonment of coastal areas, migrations to inland regions such as the Thelon and Kazan rivers, architectural shifts tied to increasing levels of residential mobility, and overall reductions in technological complexity all seem to have occurred during

the Thule-Inuit transition in the Central Arctic—albeit in varying degrees, depending upon the region. One of the most important shifts to occur involves the disappearance of Thule occupations from the Central Arctic coast by the mid-fifteenth century. Prior to this transition, Classic Thule culture, as represented by the Clachan phase in the Coronation Gulf region, is characterized by coastal settlements of semisubterranean houses (McGhee 1972; Morrison 1987, 1991). Warmer conditions resulting from the Neo-Atlantic Climatic Optimum had decreased sea-ice stability, thereby limiting the size of these Thule winter communities (McGhee 1972:123). The main subsistence practice involved the hunting of seals from the flow edge during the cold season and caribou hunting during the warm-season months (McGhee 1972:124). With the onset of colder conditions, an abrupt shift in this subsistence-settlement pattern occurred. During this “Intermediate Period,” McGhee (1972) believes that coastal sites were abandoned as Late Thule communities moved out onto the sea ice during the winter season, where they lived in snow houses and engaged in breathing-hole sealing. The kayak and umiaq fell into disuse during the Intermediate Period due to the decline in open-water hunting (McGhee 1972:124–125). Ameliorating climatic conditions during the Historic Period resulted in a shift away from spring sealing to inland caribou hunting, with continued winter-sealing aggregations taking place on the sea ice during the winter season (often referred to as the Netsilik adaptation) (McGhee 1972:125; Wenzel 2009). In this way, the development of Copper Inuit culture was seen as an *in situ* development directly out of Thule in the Coronation Gulf region. The same was thought to be true of both the Netsilik to the east (VanStone 1962) and the Caribou Inuit on the western coast of Hudson Bay (Clark 1977; Linnamae and Clark 1976). Using the evidence of continuity in material culture, for example, archaeological research supports the idea that Caribou Inuit societies developed *in situ*, directly out of Thule Inuit culture, which had arrived in the Central Arctic from the Bering Strait region during the twelfth century (Clark 1977; Gordon 1974; Harp 1959, 1961, 1962; Irving 1968; Linnamae and Clark 1976).

However, the possibility that the Copper, Netsilik, and Caribou Inuit all share a common inland origin challenges the idea that these historic societies developed directly out of Thule in the Central Arctic. Instead, a myriad of historical processes make the transformation far more complex. By way of illustration, little archaeological evidence exists for the Transitional Stage defined by McGhee (1972) in the Netsilik area and Hudson Bay coast, making it hard to demonstrate an *in situ* transition (Stevenson 1997:319). The archaeological materials that do exist for this time period resemble Mackenzie Inuit—at least on the south coast of Victoria Island (Stevenson 1997:320). Therefore, Stevenson (1997) argues that these intermediate sites may not be picking up the Thule-Inuit transition so much as they are recording a pulse of Mackenzie Inuit into the region. Stevenson (1997) agrees that the colder environmental conditions of this stage necessitated the abandonment of the Central Arctic coast, but argues that some groups moved west into Alaska, while others moved inland to take advantage of expanding caribou populations caused by the onset of colder, drier conditions, and emerging opportunities to trade with Europeans. Inland sites like Nadlok, 100km south of Bathurst Inlet, where the unusual practice of using vast amounts of caribou antler in house construction is a testament

to the emerging importance of caribou, somewhat support this idea (Gordon 1994). Once inland, these groups diverged, with one descending the Back River to become the Netsilik, and the other descending the Thelon River to the Hudson Bay coast, previously vacated by the Thule, to become the Caribou Inuit (Stevenson 1997:322). Increasing hostilities with Chipewyan, caused by the northward expansion of these First Nation groups, eventually pushed Copper and Netsilik groups back to the coast, where they took up trade with one another (Jenness 1923; Stevenson 1997).

Other models have also been proposed that challenge the *in situ* hypothesis for the Caribou Inuit on the western coast of Hudson Bay. This view maintains that the founder societies of the Caribou Inuit are not directly descended from Thule culture, but are in fact Copper Inuit from the Bathurst Inlet region of the Central Arctic coast (Burch 1978, 1986, 1988). According to Burch (1978), a migration of Copper Inuit across the tundra to the west coast of Hudson Bay had occurred just before the end of the seventeenth century. These Copper Inuit subsequently replaced or absorbed Thule populations that had established themselves on the coast a few centuries earlier, but that were reduced in size by this time. During the nineteenth century, the resulting groups eventually moved into the interior, where they developed a way of life that allowed them to live there year round (Csonka 1994, 1995:214–215). Burch (1978) cites similarities in language, dress, and architecture between historic Caribou and Copper Inuit societies as supporting his theory. However, oral histories suggest that these convergences may be attributable to more recent and episodic contacts (Csonka 1995:214–220). There is presently little archaeological or historic evidence to indicate how far back in time these contacts extend, and whether or not they pertain to a “mass” migration or merely sporadic meetings between groups.

To summarize, changes in technology, subsistence, and settlement in the Central Arctic have been interpreted by archaeologists as reflecting: (1) adaptations to the onset of cooler climatic conditions associated with the Neo-Boreal Climatic Episode, (2) the expansion of European trade, or (3) some combination of these two factors. While continuities in material culture suggest a direct *in situ* development out of Thule for some Inuit groups (e.g., the Iglulingmiut), the possibility of a common inland origin for the Caribou Inuit, Copper Inuit, and Netsilik Inuit suggests this was not the case in all regions of the Central Arctic.

THEORIZING THE THULE-INUIT TRANSFORMATION

Even though the Thule-Inuit transformation has been a topic of great interest in Arctic archaeology, most of the work conducted to date has been largely descriptive in nature. Early research examined these changes in terms of the presence or absence of culture traits (Jenness 1923, 1946; Mathiassen 1927; Rasmussen 1929). With the rise of processual

archaeology, archaeologists began searching for proximate causes, such as climate change (McGhee 1969–1970, 1972), disease (McGhee 1994), and the arrival of Europeans (Burch 1978, 1979, 1988; Smith and Burch 1979). Little attention has been paid to the processes that may have been involved.

In other disciplines, the study of transformational change has become a “hot button” topic. Books such as Stuart Brand’s *The Clock of Long Now: Time and Responsibility* argue that interactions between human societies and the environment are best understood using a perspective that takes long-term dynamics into account. In many ways, the archaeological record is ideally suited to such purposes, as it represents the legacies of past choices, beliefs, and actions. Resilience Theory has been introduced into archaeology by Charles Redman as a conceptual framework for examining change in human societies over long periods of time (Redman 2005). Originally developed for use in ecology by the Canadian biologist C. S. Holling, Resilience Theory examines stability and flux in social-environmental systems (SES), where humans interact with the environments they inhabit at varying scales (Holling 2001; Holling and Gunderson 2002; Holling et al. 2002).

The term “resilience” is defined as the capacity for an SES to absorb disturbances and reorganize, while still retaining its essential features (Holling 2001; Holling and Gunderson 2002). All of this occurs in the context of an adaptive cycle comprising four phases and usually depicted as a figure 8 (Figure 39.2). During the growth phase (r) of the cycle, the SES accumulates capital and becomes increasingly streamlined and efficient. As the SES becomes more efficient, it also becomes more conservative and resistant to change, as defined by the conservation (K) phase. At this stage in the adaptive cycle, the SES has a difficult time managing disturbances. Some disturbances, be they environmental or social,

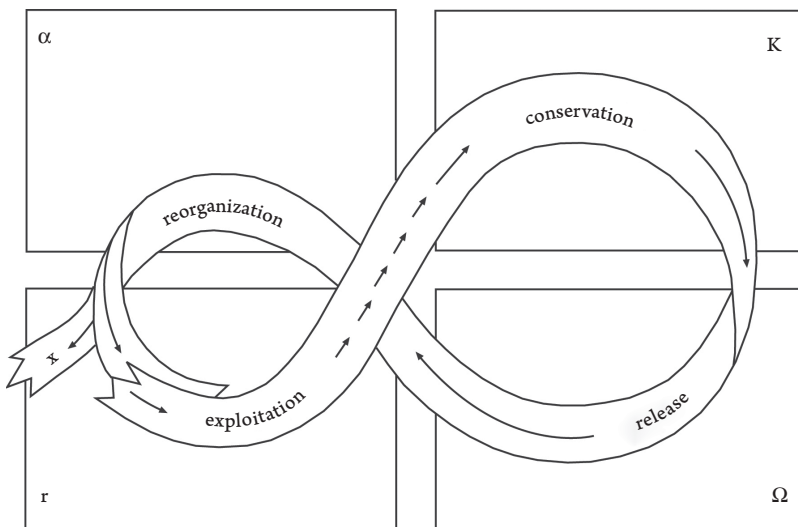


FIGURE 39.2 Schematic of the adaptive cycle used in Resilience Theory.

Drawing by Peter Dawson

might be manageable by making small-scale organizational changes to the system. Others are unmanageable, and result in large-scale transformative change, defined by the release phase (Ω) of the cycle. This can occur quite quickly, and results in the radical restructuring of the system during the reorganization (α) phase (Holling and Gunderson 2002:34–35; Redman and Kinzig 2003). The adaptive cycle then repeats itself.

Among nonhuman species, small population fluctuations serve to increase the resilience of the larger-scale system. Humans tend to resist fluctuations in their own numbers, and in the resources that support them, by remaining in the (K) phase of the adaptive cycle, where an upward trajectory of growth is maintained (Hegmon et al. 2008; Redman and Kinzig 2003). This decreases resilience, thereby making them especially vulnerable to disturbances. One of the best examples of this process in nature comes from the practice of suppressing forest fires. By eliminating small fires that keep fuel accumulation (dead wood) in check, these sources of combustion continue to grow, resulting in larger fires that are ultimately more devastating (Hegmon et al. 2008:314).

The concept of a “rigidity trap” describes situations in which the potential for growth is high, and the system itself is highly integrated and connected. Within this set of circumstances, the system becomes highly conservative in that “any novelty is either smothered or sees its inventor ejected” (Holling et al. 2002:96). Hegmon et al. (2008) have successfully combined the rigidity trap concept with human agency as defined by Anthony Giddens (Giddens 1984). The idea of repetitive acts conducted by individuals reproducing social structures suggests that these social structures could persist beyond the point where they are adaptive. Put another way, rigidity traps might result if attempts were made to maintain a set of circumstances that might be perceived by individuals to be beneficial, but that would ultimately yield unintended negative consequences (Hegmon et al. 2008). The result might be transformational changes that are harsh and wrought with human suffering.

In order for this theory to be applicable in the present case, Late Thule culture should conform to a society caught within a rigidity trap, where growth (r phase) was being emphasized at the expense of resilience. Upon arriving in the Canadian Arctic, Thule migrants likely perceived new economic opportunities, through increased whaling or sealing opportunities, and access to desirable materials like meteoritic iron. However, the numerous repetitive acts perpetrated by agents to reproduce or extend Alaskan social structures may not have been entirely compatible with the environments of the Central Arctic. By intentionally trying to maintain the status quo, individuals such as *umialiqs* may have unintentionally reduced the resilience of their societies, making them susceptible to disturbance. Two major sources of disturbance likely pushed Thule social systems to the breaking point. The first was the Neo-Boreal Climatic Period, which brought colder conditions to the Central Arctic, requiring adjustments to both subsistence and settlement systems. In some regions major shifts in subsistence and settlement occurred, as coastally situated communities were abandoned in favor of movement out onto the sea ice to engage in breathing-hole sealing, and/or movement inland to take advantage of terrestrial resources like caribou. The second was the northward expansion of First Nation groups and the arrival of European whalers and traders.

Hostilities with Chipewyan-Dene, as well as new opportunities for trade and communication, would have caused further fractures, as innovators and entrepreneurial individuals could no longer be suppressed by conservative elements promoting the old social structures. These individuals would eventually become Inuit traders, with their wealth bringing newfound status and profound changes to Inuit social organization. The impacts of these disturbances were differentially felt across the Central Arctic, leading to the variation observed historically in Central Inuit social organization—namely the differential expression of *ungayaq* and *naalaqtuq* kinship directives from west to east.

The development of the Caribou Inuit social pattern provides a particularly interesting case study of how rigidity traps might work in the Central Arctic. In a stimulating paper comparing the adaptiveness of Chipewyan Dene and Caribou Inuit subsistence and settlement systems, Friesen (2004b) argues that among the Caribou Inuit, the concepts of relatively permanent winter occupations, subsistence on stored foods, and the modification of landscape through the construction of features and facilities, were derived from deep social and ideological structures that were brought inland from the coast, and whose origins lay in their Thule ancestry. However, these proved to be ultimately incompatible with the inland environments to which they had migrated. By extending this particular form of social structure beyond its limits, Caribou Inuit societies frequently found themselves caught in rigidity traps of their own devising. The period referred to as the Great Famine of 1915–1925, caused by a cyclical low in the Qarmanirjuaq caribou population, are examples of how this kind of rigidity can result in human suffering. Oral history research with Caribou Inuit Elders has revealed that in the early part of the twentieth century, small-scale famines were effectively managed by dispersal and retreating to named places on the landscape, where one could ride out short periods of caribou scarcity (Dawson and Lyons 2011). The lingering social structures of a Thule ancestry, as suggested by Friesen (2004b), may have obfuscated such options, thereby making these kinds of disturbances even more challenging to manage.

CONCLUSIONS

The Thule-Inuit transformation in the Central Arctic remains one of the most important events in arctic prehistory. While it was a subject of great interest among early researchers, it has been pushed to the sidelines in recent years because of increasing interest in such topics as Dorset-Thule and Dorset-Norse succession, and refining the chronology of such events as the first Thule migrations. Dramatic changes occurring between the thirteenth and eighteenth centuries were fundamental in shaping the Central Inuit societies of the ethnographic present. The abandonment and subsequent reoccupation of coastal and inland areas, shifts in primary winter-house forms, mobility, and aggregation levels, the breakdown of western axes of trade and communication, and emergence of new trading opportunities through European contact all serve to distinguish Central Inuit societies from their Thule ancestors. Why did these

changes occur, and why did they manifest themselves differently in many areas of the Central Arctic? Resilience Theory suggests that by the fifteenth century, Thule societies were caught in a rigidity trap, which made them vulnerable to environmental and/or social disturbances beyond a certain scale. The result was that the inevitable transformational changes experienced by these societies were likely harsh and may have resulted in human suffering. McGhee (1994) describes historic Inuit culture as one under stress, citing evidence to support this characterization from Jenness (1923), Mathiassen (1927), and Rasmussen (1927). These early researchers describe Inuit folklore as disjointed, incoherent, and lacking both beginning and ending, and material culture as “poorly finished and decorated by Alaskan standards.” McGhee (1994) cites disease as the cause. Alternatively, these characterizations could easily be the product of the kinds of harsh transformational changes that result from rigidity traps, where hypercoherence of social structure and suppression of innovation prolong periods of increasing rigidity. Clearly much more work needs to be done if Resilience Theory is to be usefully brought to bear on this topic. For example, it may be possible to develop measures of rigidity using integration (extent of interdependence), hierarchy (differences in social power), and conformity (the squeezing out of diversity and suppression of innovation) (Hegmon et al. 2008). Such approaches have benefit in that they may increase our understanding of why societies get caught in rigidity traps, and how harsh transformative changes can be avoided.

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NOTE

1. Balikci 1984 notes that the Utkuhiksalingmiut, and sometimes the Hanningajurmiut, may equally be considered part of the Netsilik, rather than Caribou Inuit.

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CHAPTER 40

ARCHAEOLOGY OF THE INUIT OF SOUTHERN LABRADOR AND THE QUEBEC LOWER NORTH SHORE

WILLIAM W. FITZHUGH

THE Inuit of southern Labrador and the Quebec Lower North Shore (LNS) are the least researched and most poorly known of any group of Inuit in North America and Greenland. The lack of knowledge of their pioneering venture deep into the eastern Subarctic is anomalous considering their 500 years of contact there with Europeans. Documentation about their culture is hidden in exploration journals, obscure Spanish and French Basque and Quebec archives, and artifact collections scattered in western Europe and northeast North America. Only Charles Martijn (1980a, 1980b) has synthesized what is known of their history, and Marianne Stopp (2002) has provided an historical outline and source list for southern Labrador and the Strait of Belle Isle. It is assumed that the Southern Labrador Inuit (hereafter, Southern Inuit) are nearly synonymous with Labrador Inuit, whose Moravian-based ethnohistory from 1771 and later has been intensely studied by J. Garth Taylor (Taylor 1974, 1984), greatly augmenting documentation by Alpheus S. Packard (1885), William G. Gosling (1910), and Ernest W. Hawkes (1916). The nature of the evidence has been so limited that scholars in the 1970–80s disagreed as to whether the Inuit ever occupied southern Labrador and the northern Gulf on a permanent basis.

The Southern Inuit problem was explored in detail in a seminal publication of *Études/Inuit/Studies* edited by Martijn and Clermont (1980a). This report brought together historical, cartographic, and archaeological information and aired a controversy that had been brewing among ethnohistorians for more than a decade. Martijn's review led him to believe that from ca. 1620 to 1730 Inuit had been living permanently in southern Labrador and the Lower North shore, perhaps as far as Mingan (1980b:122). Norman Clermont (1980) advocated a longer Inuit tenure on the LNS

from 1550 to 1800, and Garth Taylor (1980) believed that Inuit never established permanent residence south of Cartwright and utilized the Straits and LNS only on a seasonal basis for raiding and trading. Taylor based his belief in part on the absence of archaeological evidence for southern Inuit winter villages from surveys of the Strait of Belle Isle region (Harp 1963; McGhee and Tuck 1975). Wintemberg's pioneering survey of the Quebec LNS suggested the possibility of a Dorset occupation at Kegaska and potential Inuit camps in the Mingan Islands (Wintemberg 1939), but these claims have remained unverified.

This chapter reviews what is known about the Southern Inuit primarily from an archaeological perspective. Southern Inuit ethnography and ethnohistory have not found traction among scholars primarily because of the scattered nature of the sources. During the crucial seventeenth- and eighteenth-century period when Labrador Inuit occupied these regions, they had no proponents or documentarians. No Jesuit missionaries operated here, and Moravian records from northern Labrador mostly post-date the Southern Inuit era. During the years 1550–1800, much of Southern Labrador and the northeast Gulf was an economic and political conflict zone in which a host of European agents—Spanish and French Basques, Channel French and English, Dutch, West Country English, Yankee privateers, and others—vied for profit and influence in territories that were also contested by Innu (Montagnais–Naskapi Indians) and Labrador Inuit. Innu and Inuit were attracted to the region both for its subsistence resources and access to European goods: wooden boats, canvas sails, guns and other weapons, and above all, iron, which they reworked into knives, harpoons, ulus, and other implements. Early reports, such as those of Jolliet's of 1694 (Delanglez 1948), reveal a volatile social environment with resident Inuit scattered in small bands from Mécatina to Chateau, seeking trade and operating fully equipped European chaloups (small wooden boats), but also being wary of European ships that could bring either trade or cannon-fire. For nearly two centuries, Inuit-European relations were strained by unpredictable behavior on both sides, for Inuit activities in the vicinity of the Strait of Belle Isle (the Straits) had a long history of pillaging, and European retribution was levied on any Inuit they could make accountable, whether or not they were the perpetrators. Such was the Inuit "scourge" that in the late 1760s the British Crown and Governor Hugh Paliser of Newfoundland encouraged the Moravians (*Unitas Fratrum*) to establish missions in central and northern Labrador to discourage Inuit from traveling south and disrupting commerce in southern Labrador and the Straits (Hiller 1971; Rollman 2002).

For this reason much of what can be learned about the Southern Inuit will have to come from archaeological sources, and until recently such information has been totally lacking. Only in the past two decades has research settled the challenge raised by the ambiguous historical record of Inuit occupancy. While Inuit sites indicating permanent residence of southern Labrador and the northeastern Gulf are now known, most have only been tested, and only three sites, Hare Harbor-1 (EdBt-3), Little Canso Island-1 (EhBn-9), and Hart Chalet (EiBh-47) have been excavated on the Quebec LNS. What follows therefore is outlined with a fairly broad brush.

Boreal forest with spruce, pine, birch, and other hardwoods blanket the southern interior. To the north, the land rises to nearly 1,000 meters and cooler climate results in closed-crown boreal forest being replaced by open-crown lichen woodlands, and finally, in Ungava, by tundra. The heavily glaciated interior saw the final disappearance of Laurentide ice about 5,500 years ago (Richard et al. 1982); its flat uplands with pockets of till, gravel, and peat are poorly drained and dotted with lakes, streams, and bogs. Fish, caribou, bear, waterfowl, and small game are present in the interior. Moose, abundant today, are twentieth-century newcomers. Until moose arrived, caribou was the leading subsistence resource, especially in northern Ungava where herds as large as one million animals congregated seasonally and could be killed in large numbers at water crossings during their annual migrations.

As plentiful as these resources can be, the ecology of the boreal forest and forest-tundra is subject to marked seasonal and annual variation. Caribou and other game are vulnerable to boom-and-bust cycles resulting from fires, icing of winter range, overgrazing, wolf and human predation, and zoonotic disease. These cycles and the unpredictability of animal migration routes introduced an element of instability in human adaptations (Fitzhugh 1972:167–180). In addition, the scarcity of interior resources during the summer drew human groups to the coastal zones where salmon, trout, and other anadromous fish as well as seals and birds were abundant.

By contrast, the Subarctic coasts provided a more diverse and secure resource base. Rather than the caribou-dominated economy of the interior, the marine system offered a variety of sea mammals including seals, walrus, porpoises, and whales. Salmon, trout, cod, and many other fish were abundant in summer and some could be caught throughout the year. Migratory birds and winter avifauna were available in addition to virtually all of the terrestrial species noted above, including caribou, whose migrations often included coastal regions. While population levels of species like harp seals, which migrate between Greenland, Newfoundland, and in the Gulf, could vary, secondary resources were always available. As a consequence, in coastal regions weather, disease, and social issues, not starvation, have been the common causes of privation. Productive coastal ecology promoted adaptations that included specialized material culture, semipermanent dwellings, winter villages, large group sizes, and storable food surpluses. Kayaks, large skin boats, and dogsleds enabled Inuit to travel long distances for trade, socializing, hunting, or war. These cultural and ecological adaptations gave the Inuit social and political advantages over the more scattered, low-density Innu societies of the forested interior.

BACKGROUND AND EARLY HISTORY

Thule people arrived in Killinek at the northern tip of Labrador between 1250 and 1300 (Fitzhugh 1994; Kaplan 1980). As they began expanding south they encountered a physical and social environment different from any they had experienced since leaving Alaska. Inuit expansion did not take place in a cultural vacuum and was not

simply a response to the arrival of Europeans in Newfoundland after 1500. Late Dorset Paleoeskimos were still residing on the Torngat coast; Innu occupied the forested interior, the Quebec LNS, and parts of the central Labrador coast, on a seasonal rather than permanent basis; and Beothuk Indians had recently replaced Dorset people in coastal Newfoundland.

The first recorded post-Norse European contact with Labrador Inuit was John Davis's visit to Davis Inlet in 1587 (Markham 1880). Davis's account provides ethnographic detail and a foretaste of the difficulties Europeans and the Amerindians were to face in dealing with large groups of well-armed, trade-savvy Inuit as they expanded out of the Central Arctic. By this time, Basques and a variety of French and English groups had been active around Newfoundland and the Strait of Belle Isle, known to the Basques as "Grand Bay," for fifty years with only occasional mention of Inuit during the latter part of the sixteenth century (Barkham 1980). For most of the 1500s, Inuit settlements remained north of Hamilton Inlet, where their populations grew, supported by a thriving whaling economy. During the first half of the seventeenth century, Dutch whalers plying the Labrador coast engaged in seasonal trade with Inuit (Kupp and Hart 1976), providing goods and materials directly to Inuit communities. However, after decimating the southern whale and walrus populations, Dutch whalers moved north into Davis Strait and Greenland waters. Their departure encouraged Labrador Inuit—by this time well accustomed to European materials, especially wooden boats and iron—to turn south and engage the Europeans fishing in the Strait of Belle Isle and Gulf of St. Lawrence. Inuit southern ventures were also aided by the onset of colder climates of the Little Ice Age that expanded the Arctic marine regime via the cold Labrador Current, producing more extensive winter sea-ice coverage and expanding the ranges of Arctic sea mammals deeper into Subarctic waters. One of its important effects was creation or expansion of the harp seal pupping and breeding colony in the eastern Gulf of St. Lawrence (Johnston et al. 2012; Fitzhugh 2014a).

Basque records from the latter part of the sixteenth century make little note of contacts with Inuit (Barkham 1980), most likely because the Inuit recognized their vulnerability to Basque fleets and weapons and remained north of Cartwright. However, after 1600, Inuit seasonal raids became an ever-present threat to the emerging small-scale fishing and trading enterprises that followed the Basque decline (Barkham 1980; Turgeon 1998, 2000). For the next two centuries, Inuit continued to venture south, opportunistically trading, raiding, and carrying goods or booty north. The aggressive Inuit stance and the unpredictability of Inuit encounters restricted the expansion of European fisheries and trade north of the Straits throughout the seventeenth and eighteenth centuries.

During the period 1550–1850, Labrador Inuit culture underwent major changes as a result of interactions with Europeans and the acquisition of metal tools, ceramics, European hardwoods, tobacco, and other materials, including firearms (Rollman 2011). Access to European goods resulted in changes to Inuit social structure as families consolidated under powerful leaders who managed access to European materials through raiding, trading, warring, and eventually accommodating to European ways (see Kaplan and Woollett, this volume, chapter 36; also Jordan 1978; Kaplan 1985a, 1985b;

Taylor 1974). Floods of European materials began to appear in Inuit settlements, beginning with raw materials like iron, canvas, and boats, but eventually including beads, teacups, and decorative objects of social import. At the same time, central coast Inuit houses grew in size to accommodate 20–40 individuals from closely related families, whose leaders had acquired European vessels and sailed the entire coast of Labrador, north to south, exchanging ivory, skins, and baleen from the northern hinterlands for European goods obtained at the southern posts. After the arrival of Moravian missionaries in the late eighteenth century, the establishment of trading posts within Inuit territories, and European overhunting of whales and walrus, the era of the central Labrador middleman-trade boom collapsed. By 1800, Inuit had begun to convert to Christianity and moved into Moravian-centered settlements. Inuit communities fragmented, middlemen and shamans lost their social and political power, and large multifamily communal houses reverted to single-family dwellings with plank walls, wooden floors, glass windows, iron stoves, and vestibule entries rather than subterranean entrance passages. Despite these trends, Inuit-style subsistence and technologies, including the use of toggling harpoons and soapstone lamps and cooking pots, continued much as before, aided by efficiencies created by European goods and materials (Woollett 2007, 2010).

The Inuit advance into southern Labrador and the Gulf followed the geographic and environmental continuities that carried Arctic tundra environments and its seasonal sea ice-associated marine-mammal ecology south of the forest boundary to the Strait of Belle Isle and along the LNS as far west as Natashquan. The record of this expansion has not been favored by high-quality historical sources. The earliest records, found in the Spanish Basque archives (Barkham 1978, 1980), are commercial and legal documents without much cultural information, while post-1600 records contain uncertain ethnic classifications. Between 1540 and 1600, Inuit appear rarely in Basque and later sources for the Grand Bay region, roughly from Chateau to Blanc Sablon (Barkham 1980; Stopp 2002). However, after the withdrawal of the large Basque fleets after the 1580s, Inuit began appearing in increasing numbers. From then until the early 1700s, Inuit were present here and in the Gulf sporadically, first as raiders burning seasonally vacant European posts for their nails and stealing boats, anchors, lines, nets, and planks, as well as small goods. One such raid occurred at a French post established by Pierre Constantin at Red Bay in 1715, which was plundered by Inuit three years later (Tuck 1986). Gradually plunder gave way to direct contacts, in which a barter trade became possible, but these engagements, both shore-based and ship-side, were dangerous for both sides and outbreaks of violence, kidnapping, or vengeance taking were common.

Louis Jolliet's voyage of 1694 provides a rare overview from the middle of this period by an explorer interested in documenting observations of Native life (Delanglez 1948). Sailing east along the LNS in 1694, Jolliet heard from Innu about Inuit village locations and Innu-Inuit conflict, but he met no Inuit until he reached the vicinity of Chateau at the northern end of the Strait of Belle Isle. Here he found a large Inuit group camped and equipped with European boats, sails, and anchors, eager to trade (Delanglez 1948:217; Martijn 1980b:120). Nearby in St. Lewis Bay, he met more Inuit and inspected a recently

abandoned winter dwelling. His reports resemble those provided by Martel de Brouague (1923) concerning Innu raids on NLS Inuit villages in 1728–1729.

ARCHAEOLOGY OF THE SOUTHERN INUIT

The first surveys of the northern Gulf and western Newfoundland produced sporadic finds of Inuit affiliation but not demonstrable evidence of occupation sites. William J. Wintemberg identified as “Eskimo” a pithouse on Keppel Island in western Newfoundland, partly on the basis of an apparent Inuit nangissat (hopping stone) alignment (Wintemberg 1939:86; Harp 1951, 1963). Both features have since been questioned (Fitzhugh 2009:133). In 1971–1972, while surveying St. Paul Bay, the location of a historically known battle between Innu and Inuit, Charles Martijn found an Inuit snow knife and lance point, and an Inuit mandible at Kettle Head (EiBk-3) (Martijn 1974; Martijn and Clermont 1980b). A few years later, archaeologists working at the Red Bay Basque site uncovered a cache of artifacts at Twin Island-3 that included a Thule culture soapstone vessel and a ground-slate endblade together with Basque material. The ground-slate blade dates the cache to the late 1500s before trade iron replaced stone tools (Tuck 1984, 1985; Pastore and Auger 1984).

A concerted search for Inuit settlement sites led Réginald Auger in 1983–1984 to a rectangular sod-house foundation on the Seal Islands in Chateau Bay, at the north end of the Strait of Belle Isle. Inuit structures can be confused with dwellings of European fishermen, but this house contained lateral sleeping benches, a stone-paved floor, a toggling harpoon, soapstone vessel fragments, a seal-tooth pendant, and middens with harp seal bones, as well as eighteenth-century European artifacts. Similar “Europeanized” assemblages demonstrating Inuit accommodation to Europeans were recognized at Eskimo Island in Hamilton Inlet (Fitzhugh 1972; Jordan 1977, 1978; Jordan and Kaplan 1980; Kaplan 1985a, 1985b). Seal Island showed that southern Inuit sites would demonstrate even greater changes in material culture, architecture, and subsistence, and would not closely replicate northern house styles and assemblages, especially in the absence of organic preservation. Rather they would show social and belief changes that came with European contact, including the practice of Inuit women marrying or being indentured to European men, and the adoption or enslavement of Inuit women and youths as European men began to over-winter on the coast (Brouague 1923:384).

In 1991–1992, Marianne Stopp (1997, 2002) surveyed southern Labrador from Cartwright to the Straits. Numerous sod-house foundations, cache pits, summer tent rings, and burial cairns were located, but no winter houses were found. In other areas of Labrador, stone fox-traps have proved to be a reliable indicator of Inuit winter activity before they obtained iron spring-traps from Europeans, especially when found with stone cache pits. In 1986, Inuit sites were found for the first time south of Hamilton Inlet, in Snack Cove near Cartwright (Fitzhugh 1987; 2009:136) and were radiocarbon dated to ca. 300–360 B.P. Subsequently, Lisa Rankin and her students excavated this and nearby Inuit winter villages, revealing

well-preserved communal dwellings with large samples of artifacts and faunal remains from the late sixteenth to the eighteenth centuries (Brewster 2006; Rankin 2010; Murphy 2011). Finally, excavations at North Island-1 in St. Michael's Bay, southern Labrador, revealed two communal winter houses dating from the late seventeenth to mid-eighteenth centuries containing a mixture of French ceramics, iron nails, and other European materials, together with Thule type 5 harpoon heads (Stopp and Wolfe 2011). These results confirmed long-term Inuit occupation in Cartwright and at least intermittent wintering on the southern Labrador coast from ca. 1650 to 1800. However, this site distribution did not extend south of Chateau into the Strait, where extensive surveys have failed to identify Inuit settlement (Harp 1963; McGhee and Tuck 1975). Research at the southwestern terminus of the Straits around Blanc Sablon has also failed to locate Inuit sites (Pintal 1998). Similarly, there is still no evidence of permanent Inuit occupation in Newfoundland, despite records of regular Inuit access for bow-wood and perhaps soapstone as far east as Notre Dame Bay (Lysaght 1971) and of Inuit place-names (Martijn and Dorais 2001).

THE QUEBEC LOWER NORTH SHORE

Inuit sites reappear at Brador, at the western end of the Strait of Belle Isle, where sedimentary rocks disappear and the coast returns to its Labrador character—isolated bays of granite and gneiss—and continues for 350 km to Natashquan. Although appearing barren to Cartier, this geography, like the coast north of the Strait, is well suited to Inuit life. One of its most important resources is the annual harp seal migration, which passes through the Strait and follows the coast west to Natashquan before ending on the frozen sea ice in the central Gulf (Figure 40.2). Here, during spring, harps give birth and wean their pups before heading back north along the western coast of Newfoundland and through the Labrador Sea to their summer ranges in the Arctic. The harp seal migration, which today numbers 5–9 million animals (Johnson et al. 2012), was the most important component of Inuit winter subsistence, and the annual migration must have been a strong incentive for Inuit expansion south of Hamilton Inlet.

Martijn's campaign to identify permanent Inuit settlements on the LNS resulted in a breakthrough in 1983 when two Inuit winter houses were found at Baie des Belles Amours (EiBi-19) 10 kilometers west of Brador (Dumais and Poirier 1994). Surface features indicated two rectangular communal-style winter houses with low sod walls, side and rear sleeping platforms, and 4–5 m long entrance passageways. Test pits recovered bones of caribou and seal, a soapstone cooking pot fragment, and European artifacts dating to the seventeenth and eighteenth centuries. The houses appeared contemporaneous, and each would have housed 15–20 people. A subsequent visit in 2007 confirmed earlier results and determined that the occupation, which included an Inuit grave cairn, probably lasted only a few years. Although the site's chronology is not certain, its location in Brador Bay, an excellent fishing and sealing location that became prominent after establishment of Fort Ponchartrain by Courtmanche in 1703–1705, suggests a European connection.

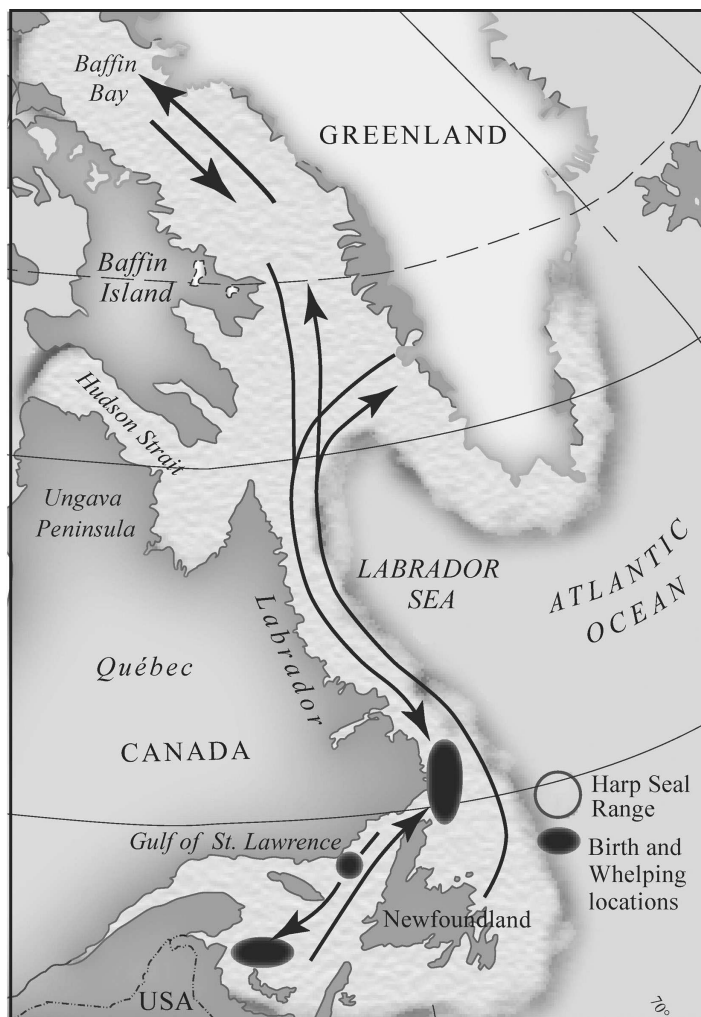


FIGURE 40.2 Harp seal migration, a critical resource for Southern Inuit.

Drawing by Marcia Bakry, Smithsonian Institution

RECENT RESEARCH

In 2001, the Smithsonian began a decade-long investigation of the LNS, searching for the southern boundaries of Labrador Paleoeskimo and Indian cultures, as well as signs of the elusive Southern Inuit (Fitzhugh 2006). We began in the Mingan Islands, where Wintemberg had reported Dorset and Inuit sites. At Cap Sèche on Niapiskau Island we found a rectangular tent structure and a hearth that resembled Labrador Inuit structures of the seventeenth and eighteenth centuries, but no diagnostic Inuit artifacts appeared and no other Inuit traces or Dorset materials were found here or between Mingan and Cape Whittle.

Like St. Paul River, with its stories of Indian-Inuit battles and place-names like Eskimo Harbor, Battle Harbor, and Eskimo Island, Jacques Cartier Bay also had an Inuit history, but in this case it was from Inuit immigration from the central Labrador coast in the 1820s to 1840s (Charest 1998). According to Charest (see also Robertson 1843; Packard 1885; Puyjalon 2007 [1894]), these Inuit came to assist fishing stations, trading posts, and missions managed by whites who earlier had served at posts further north in Labrador and the Arctic. Some were women who had married post managers, while others came as individuals or families for a variety of reasons. The names of more than a dozen Labrador Inuit are known: Louis the Eskimo (St. Augustine), John Louis (Shekatika), Dukes (St. Paul/Vieux Fort), Pawlo, and others. Today their ancestry continues in the Nadeau, Driscoll, and Shattler families of St. Augustine, and the Dukes and Fequet families of St. Paul. Charest's data from 1980 documented 784 LNS individuals with direct Inuit blood-lines.

While visiting L'Anse-du-Portage at the western entry of Jacques Cartier Bay, we heard a story about an Inuit woman—date uncertain—who was buried with a soapstone vessel in a nearby cleft in the rocks (Nicholas Shattler, personal communication 2005). Local people found the grave and later gave the vessel to a visiting American collector. Charest (1998:27) recorded a similar story and believes the transaction dates to ca. 1950. Attempts to find the burial, the name of the collector, and the present location of the artifact have been unsuccessful (Fitzhugh 2009:139). However, the story acquired more substance when we found stone meat caches and Inuit fox-traps at several sites on Canso Island. In 2011, these indications were rewarded by the discovery of an Inuit winter village containing three sod-house foundations on Little Canso Island-1 (EhBn-10). Tests in 2011 and excavation of House 2 in 2012 produced Inuit artifact collections and winter-house architecture with raised sleeping benches and a 6 m long entrance passage (Figure 40.3). These finds suggest the Inuit woman's burial may have been related to the Canso Island sites which now can be dated to the late seventeenth or early eighteenth century.

Research by René Levesque in the 1970s resulted in the discovery of a third LNS Inuit winter village one kilometer west of the mouth of the Brador River (Levesque 1971). The Hart site (EiBh-47) lies in a northern embayment of Brador Bay. Levesque mistakenly believed the site was Basque because he found roof tiles, iron spikes, and whale bone. Our subsequent investigations on its uplifted beaches identified a full suite of prehistoric components from Maritime Archaic to Recent Indian, including Groswater and Dorset Paleoeskimo, but we found no Basque or other European occupations. The source of the tiles and iron turned out to be three winter Inuit communal houses hidden under thick forest cover. Tests and partial excavation of House 1 revealed middens containing harp seal, caribou, and fish bones, and artifacts including whale-bone sled-runners, an ivory needlecase, iron arrow and lance points, stone and glass beads, and large amounts of nails, tiles, glass, stoneware, and earthenware (Fitzhugh and Phaneuf 2014: 47). Dates on beads and ceramics suggest the site was occupied for several decades in the late 1600s.

In our initial 2001 survey we found an unusual site in a small harbor on the southern tip of Petit Mécatina Island, 15 kilometers east of Harrington Harbor (Fitzhugh 2006). Hare Harbor-1 (EdBt-3; Figure 40.4) lies on a narrow terrace backed by a high cliff on



FIGURE 40.3 Excavation of House 2 at Little Canso Island-1 Inuit village (EhBn-9), Jacques Cartier Bay.

Photograph: Wilfred E. Richard



FIGURE 40.4 Hare Harbor-1 (EdBt-3) Basque and Inuit site on Petit Mecatina Island.

Photograph: Wilfred E. Richard

its north side. The site announced itself as Basque when roof tiles were found eroding from the bank; but as soon as excavations began Inuit soapstone lamp and pot fragments were found together with European materials on the slab-paved floor of Structure 1, a typical Basque open-sided, tile-roofed facility that was probably used for cooking, washing, and bathing. Other finds from the floor included late seventeenth-century clay pipes, Normandy stoneware, nails, and other materials, including glass beads dated to ca. 1680–1730 (Herzog and Moreau 2006). One of the paving slabs had an oval stain from an Inuit oil lamp.

Below the cookhouse pavement we found an earlier Basque component consisting of several small cooking hearths containing marmite and glazed faience cookware. One of the hearths had a pavement of baleen strips and another contained a small iron fish-hook. A large open hearth in Area 9 produced a similar “early Basque” assemblage with baleen. Although sharing some earthenware types with the upper floor, the early occupation lacked clay pipes, glass beads, and Normandy stoneware so common in the cookhouse collections. Outside the cookhouse a path paved with roof tiles led to a second slab-paved structure (S2) that turned out to be a blacksmith shop, in which we found bars of iron stock, a broken ship’s anchor, gun-flints, and a gun fusil mechanism. Immediately below the smithy pavement was a third structure consisting of a floor paved with barrel staves whose upper surfaces were charred by fire. Structure 3 was identified as an Inuit winter dwelling by its distinctive cold trap and its stone lintel doorway located at the inner end of a 3 m long semisubterranean entry passage. The upper part of the house had been burned, leaving scattered pasty clumps of burned bone on the floor. Further confirmation of Inuit ethnicity came when a girl’s soapstone lamp and a boy’s broken spring-bow were found in the doorway beside a wooden toolbox of European construction. Other finds included Basque tiles, clay pipes, and European ceramics and glass beads similar to those found in the cookhouse. Absence of an intervening soil level indicated the smithy was established immediately after the destruction of the underlying Inuit house.

A fourth structure 20 meters from the cookhouse provides a more complete view of the Hare Harbor Inuit. Structure 4 is a rectangular winter dwelling with sod walls, paved floor, cold-trap, rear sleeping platform, entrance tunnel, and extensive external midden (Area 8). Rather than being built of rocks, sod, and soil in typical Inuit fashion, the walls were composed of rocks and whale bones embedded in clean, pristine charcoal. The stain of an oil lamp was found on one of the floor pavements along with soapstone pot fragments. European materials included Normandy stoneware, glazed and plain earthenware, clay pipes, iron spikes and nails, iron knife fragments, lead navigation sounding weights, lead fishing sinkers, and glass beads. When the house was abandoned its occupants left a large cache of nails and an iron axe on the threshold floor slab. Most of the finds have duplicates in the cookhouse and smithy. Despite the absence of Inuit objects other than soapstone vessels and an antler spear point (other organics were missing due to acid soil conditions), there can be no question about ethnicity since the structure is identical to late seventeenth- or early eighteenth-century Inuit winter houses in Labrador. The mystery of the charcoal-filled walls was explained when excavations

outside S4 revealed extensive deposits of pure charcoal within a large boulder-filled hearth area and in a 2 m deep pit filled with charcoal and stone slabs, roof-tile fragments, and a glass bead. An Inuit soapstone lamp was found resting on a third hearth adjacent to these features. These finds and the presence of soapstone vessels in the cookhouse link the Hare Harbor Inuit to the Basque workshops and charcoal-production activities.

Soon after beginning land excavations at Hare Harbor, we discovered an underwater midden in the adjacent landing cove where several seasons of excavation produced finds of sixteenth- to eighteenth-century Basque origin: marmite earthenware vessels, ceramic heating boilers, chaffing dishes, an Iberian olive jar, boat parts, barrel staves, fiber mats, shoes, hemp rope, butchered bowhead whale bones, and masses of tile, wood-working debris, and market-processed codfish bone. Identical materials came from the underwater excavations at Red Bay (Grenier et al. 2007). The Hare Harbor finds were found in four stratigraphic layers dating from the late sixteenth to early eighteenth century. The lowest level with butchered whale bones probably dates to Spanish Basque whalers of the late sixteenth or early seventeenth century, contemporary with the lower cookhouse layer and the Area 9 hearth. The upper underwater levels probably date to the more substantial activities of the later (likely French) Basque and Inuit occupation dating ca. 1700. In addition to contributing whole vessels to the collection inventory, including well-preserved food and fiber remains, the underwater deposits provide evidence for whaling, timber production, cod fishing, and bird hunting.

Hare Harbor appears to have been occupied by one or more Inuit families for several years around 1700 when Europeans—probably French Basques—operated a logging, fishing, and hunting station (Fitzhugh 2009, 2014b, 2015; Fitzhugh et al. 2011). The presence of comingled Inuit and European finds in both Inuit and Basque structures argues for a station operation with Inuit partners. There is no other easy explanation for the large amount of European material in an Inuit winter house, including an iron ax, large amounts of lead, ceramics, beads, iron nails, and even musket balls, found together with Inuit soapstone pots and lamps. Conversely the presence of soapstone vessel fragments and glass beads in a Basque cookhouse and smithy, signal Inuit activity.

SOUTHERN INUIT-EUROPEAN RELATIONS

To date no records have been found to identify Hare Harbor's European or Inuit occupants. In his 1843 treatise "Notes on the Coast of Labrador," Samuel Robertson provides the only known direct written reference to the site: "Three years ago, at Little Mecatina, in the cove called Esquimaux Harbour . . . a person had occasion to remove part of a *terrasse* to make a garden. He found an iron instrument, of about eighteen inches in length, of a crooked form, which I conjectured to be a *Cerp*, such as were used 300 years ago in Spain—if my supposition is right, the remains must have been those of the Basque, as the Norman and Breton countries are not vine countries" (Robertson

1843:28). It is ironic that Robertson discounted local tradition of Inuit at “Eskimo,” supposing it was exclusively Basque.

While the LNS offered Inuit opportunities for obtaining new subsistence resources and European materials and goods, establishing permanent settlements along the NLS involved many new hazards. Relations between Inuit and different European groups were unpredictable and volatile; piracy and station raiding among competing English, Breton, and French and Spanish Basque parties was common, and each to varying degrees was trading with the Innu and/or Inuit. The extent to which Inuit were involved directly in these activities is difficult to determine, but economic collaboration has been noted (Barkham 1980:54; Belvin 2006: 29–31; see also Loewen and Delmas 2011, 2012, for Basque history in the Gulf) and probably was more extensive than noted in early records.

As occurred later in the nineteenth century, when Inuit participated in the English and Scottish whaling in Davis Strait (Eber 1996), Southern Inuit made important contributions to earlier European exploitation ventures, even though their participation is rarely noted in historical records. Post managers did not have the generations of Inuit knowledge and experience on the land needed to efficiently exploit local resources. Further, Europeans often did not reside at field stations throughout the year; their primarily open-water-season presence would have caused them to miss the lucrative harp seal hunt in late fall and spring, and the productive hunting of caribou and furbearers in winter. Seasonal absence would have given European managers strong incentive to enlist native assistance, especially from marine-adapted Inuit, who would have participated as families or groups of families, for both security and subsistence needs. Inuit assistance might also have included the important task of defending the abandoned stations from attacks by claim-jumpers or marauders, whether Europeans or Innu. As noted by Brouague, such attacks tended to occur during the winter and spring when posts were isolated and vulnerable, being easily approached over the winter sea ice.

Hostilities were part of the new frontier Inuit experienced during their expansion and settlement in the northeastern Gulf. It is well known that the Innu resented the Inuit, whose incursions during the fourteenth to seventeenth centuries in Labrador and along the LNS expropriated Innu summer fishing and hunting grounds (Rogers 1964; Taylor 1964). In addition, the Innu along the LNS were being armed by the French, whereas the Inuit, whose resistance to European encroachments in Labrador resulted in an English embargo on arms trade, lacked rifles. Hostilities on the LNS seem to have come to a head in the late 1600s and early 1700s. In 1729, Martel de Brouague, writing from Brador, reported a French and Indian attack in 1728 at Mécatina that resulted in the massacre of two Inuit families (Brouague 1923:384; Martijn 1980b:119–120, note 23). This attack may have taken place at Hare Harbor, which was known as “Esquimaux Harbor on Petit Mécatina,” although it could have been further east at Gros Mécatina. Such an event might explain the burned Structure 3 Inuit dwelling and its piles of bone ash. Brouague’s notes also include reports of attacks on other Inuit settlements by “Spaniards,” another indication of the volatile nature of interactions along the convoluted LNS, with its many shoals, uncharted waters, and absence of policing authorities. Inuit families had been observed living around Gros Mécatina Island (La Tabatière) by Jolliet in 1694 and by

Courtmanche in 1702 (Stopp 2002:83). Trudel (1978, 1980) has emphasized subsistence issues resulting from the decline of the fishery by Europeans as the more important factor in Inuit withdrawal than European and Innu attacks. Nevertheless, it is hard to dismiss the many reports of hostilities documented in sources like Thwaites (1896–1901), Champlain (Biggar 1936), Jolliet (Delanglez 1948), and Brouague, noted also in place-names and local tradition, as a crucial factor in Inuit withdrawal from the Gulf.

SUMMARY

The emerging archaeological evidence suggests that Hare Harbor-1 and the other Inuit sites noted above were settled by Inuit who began moving south from central Labrador and west along the LNS in the early to mid-seventeenth century. There are no Inuit remains from the “early Basque” component at Hare Harbor, presumed to date ca. 1600. Although the precise timing and size of this migration and its subsequent retreat remain to be clarified—and it may have included residence—their southward movement seems to have been well planned and systematic, similar in nature to the initial Inuit expansion down the Labrador coast in the 1500s. Soon after the departure of Basque fleets from the Straits and northern Gulf after the 1580s, the Inuit from central Labrador began seasonal forays into the Straits, trading or raiding depending on the forces arrayed against them, and returning north with valuable goods. At first these southern voyages may have been largely male endeavors, as danger was considerable, but in time families became involved, as indicated by Jolliet’s records of 1694. Some families established permanent quarters north of Chateau, maintaining connections with their relatives further north who supplied them with trade products in exchange for European goods. In some respects the initial Inuit expansion has parallels with the Viking raids of the eighth and ninth centuries in Europe, when independent groups of northmen sallied from local harbors to loot and plunder southern riches and return home with spoils, later establishing permanent camps from which Viking groups staged raids and forced tribute from local communities. Eventually slaves became wives and local Norse acculturation occurred. Similarly, Inuit pioneers in the south found it advantageous to develop peaceful relations with European station operators, and as the latter expanded their activities, wintering over and taking Inuit concubines and wives, closer economic and social exchanges evolved.

The outlines of Southern Inuit history may be summarized in hypothetical stages that take account of known facts (adapted from Fitzhugh 2009:141–144).

- (1) *Exploration and First Contacts*: Inuit appearance in the south first occurred during the sixteenth and early seventeenth centuries and involved exploration and sporadic early European contacts. This stage may be represented by the sixteenth-century Thule finds at Twin Island-3. Inuit may have reached Cartwright and probed the Straits, looting and pillaging seasonally abandoned Basque settlements. It appears they chose not to engage these numerous and heavily armed forces directly.

- (2) *Opportunistic Raiding and Trading*: The appearance of Dutch whalers and traders on the central Labrador coast opened new opportunities for direct local exchange with Labrador Inuit villages, but these sea-based contacts were sporadic and unpredictable. Of more import was the reduction of the Basque fleets after the 1580s, which permitted Inuit from the central coast to begin more systematic raiding and trading voyages into the Straits. In response, Inuit middlemen began to form links throughout the Labrador coast and with traders in the south. The decline of whales and walrus due to European harvesting required new initiatives to replace the role whaling and walrus hunting had played in the establishment of Inuit social hierarchies and leadership in the previous era of population and settlement expansion. Raiding and trading in the south offered these rewards.
- (3) *Southern Settlement and Service*: By the end of the seventeenth century, Inuit settlements had expanded west of Brador supported by a traditional Inuit subsistence and settlement pattern, with heavy reliance on harp seals and caribou rather than the decimated whales and walrus. By this time the Spanish, French, and English were all seasonally active along this coast, and permanent relationships began to be established with the Inuit. The LNS Inuit occupation dates to the period when large amounts of European material flowed into the Labrador Inuit world. Some Inuit families became active agents in the European-Inuit trade. In other cases, as at Hare Harbor, Inuit may have been serving as partners, service employees, and station guards for European establishments that exhibited both European and Inuit architecture.
- (4) *Expulsion and Retrenchment*: Hostilities in the early eighteenth century resulted in the expulsion of all or most Inuit from the LNS. This is often attributed to French-assisted Innu activity, but “Spaniards” are also implicated. The topic remains poorly known and little researched, and may have been accelerated by increased economic competition and a decline in the cod and seal fishery resulting from European exploitation and climate change (Woollett 2007). Disease, attacks, and the desire by French and English agents to establish control over LNS resources, and an absence of political support for providing security for commercial ventures, may have had the effect of eliminating Inuit settlements, whose residents, those remaining after the depredations, took shelter with friendly European pioneers or retreated north to Labrador.
- (5) *Re-Settlement and Integration*: Early in the nineteenth century, Inuit returned to the LNS as servants and employees of the more stable fishery operations that were then operating. Most of these Inuit settled in St. Augustine and St. Paul River and introduced a variety of Inuit subsistence technologies and adaptations to the growing populations of French, English, and Innu, including dogsled driving, seal-hunting with toggling Eskimo-style harpoons, ulus, Eskimo parkas, seal-skin boots, and other items.

While only a skeletal framework requiring elaboration, this reconstruction presents a more plausible scenario of Southern Inuit history than models which assume rigid maintenance of cultural boundaries, separate settlements, different economies, and

contrasting ideologies. Given the evidence that is beginning to accumulate, we can expect more complex types of social interaction between Inuit and Europeans as both began to settle and adapt to local conditions. Rather than continuing the earlier pattern of isolation and hostile acquisition, some Inuit families realized advantages in European collaboration and economic integration. Multilingual and interethnic families would have become common, initiated first by hostage taking, then by indentured service, concubinage, and later by voluntary service, employment, and marriage.

The archaeological information now becoming available reveals a pattern of Inuit settlement south of Cartwright that conforms roughly to what is known from most Arctic and Subarctic Native-European contact zones throughout the Northern Hemisphere: (1) initial contact in which European or East Asian technology holds powerful sway over native people; (2) a phase in which Natives quickly learn to exploit vulnerabilities of the newcomers, such as their inability to travel, hunt, and survive independently in the Arctic, the absence of supporting communities, and requirement for European foods and tobacco; (3) Native intimidation of early emissaries, explorers, and traders; (4) early trade and accommodation; (5) splits in Native populations between "post" and "heathen" Natives, and the establishment of middlemen among both groups; (6) increasing Native settlement and interethnic mixing around posts, or white settlement in Native regions; (7) religious conversion and acculturation, and the breakdown of Native social structure; and (8) various subsequent engagement scenarios.

Labrador Inuit seem to have followed a similar path. Because Europeans did not arrive in Inuit communities on the central Labrador coast until the mid-eighteenth century and in northern Labrador until the 1770s, Labrador Inuit culture remained intact and continues today despite traumas of disease and alcohol, loss of key subsistence resources like walrus and whales, religious conversion, and language loss. The toll for the Southern Inuit was perhaps even greater, given 500 years of European engagement at the southern Inuit boundary. Future DNA studies will probably reveal a large element of Inuit biological continuity among the present white and Métis population of these regions.

The model proposed here resembles historical-acculturation models presented by Richard Jordan and Susan Kaplan for the central Labrador coast, scenarios outlined by Garth Taylor in the debate over southern Inuit in the 1980s, and Loring's and Cabak's more recent work on the "heathen" Inuit of northern Labrador (Cabak 1991; Loring 1998). This view suggests a 500-year continuum of culture change along the Labrador coast driven by two dominant forces: (1) the desire by Labrador Inuit to maintain their culture, independent life style, and traditional subsistence economy; and (2) external forces of modernization, innovation, and acculturation that brought new technologies, economies, demographics, diseases, and religions into play. For the first 300 years of contact these forces were focused largely in the south, even though their indirect effect also transformed the entire Labrador Inuit world in a doppler-like fashion as far north as Killinek. For the past 200 years, external forces were brought into play first by European Moravians and then by traders and governments involved within northern Inuit communities. Today these influences are still essentially "southern" in origin, operating through Newfoundland, Eurocanadian, and global political and social processes, even

though a degree of self-determination and territorial control has emerged recently as a result of land-claims settlements.

It remains to be seen how knowledge of the Southern Labrador Inuit will develop in the future. With many historic sites now being recognized, there is a bright future for archaeological recovery and interpretation. However, southern Labrador and the Lower North Shore still remain almost unknown archaeologically, with only a few sites identified and partially excavated. Together with the existing textual and archaeological remains from northern Labrador, which often includes excellent organic preservation, the new southern sources can provide resources for studying Inuit responses to multi-cultural and environmental interactions. The long engagement of Labrador Inuit with Europeans and Innu, and the changing environments resulting from European exploitation coupled with the effects of climate change during the Little Ice Age, provide a remarkable potential for researching distinct traditions of cultural survival, expansions and setbacks, interactions, and change. Recent archaeological discoveries ensure that the Southern Inuit can now be part of that story.

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